AUTOMATION AT THE LIBRARY OF CONGRESS: INSIDE VIEWS

LIBRARY OF CONGRESS PROFESSIONAL ASSOCIATION

AUTOMATION AT THE LIBRARY OF CONGRESS: INSIDE VIEWS

Edited by Suzanne E. Thorin

LIBRARY OF CONGRESS PROFESSIONAL ASSOCIATION
1986

TABLE OF CONTENTS

The New Technologies

Miscellany

PREFACE

Automation--the word evokes challenge and excitement on one hand, and anxiety and trepidation, on the other. Few would deny that automation is responsible for a continuing revolution in the library profession. It is for this reason that the 1984 LCPA Executive Committee decided to make automation the theme of its first special publication. Fostered by two subsequent executive committees and by its editor, Suzanne E. Thorin, the work will amuse, inform, challenge and stimulate you. If it then should cause a new dialogue on the subject, our original purpose will have been richly achieved.

The LCPA Executive Committee
1984, 1985, 1986

INTRODUCTION

Inside Views is a modest, plainly wrapped and inexpensively produced publication. As you read the articles, however, you will begin to feel the enormous breadth of the Library's automation efforts and the intense involvement of its staff. You will read about plans that failed and those that have been enormous successes; about frustrations at delayed implementation of systems, and of conflicting goals. What is unmistakably clear is that we regard ourselves as part of a lively family where members chide, criticize and laud each other regularly. It strikes me that most of us don't want to work anywhere else.

The editorial board, the contributors, and many other volunteers spent untold lunch and after work hours, planning, writing, typing and pasting up this publication. I cannot imagine finding another organization where so many people give so much of their own time.

The idea for a publication on automation was conceived by the 1984 LCPA Executive Committee, but the editorial board for Inside Views -- Winston Tabb, Barbara Finfrock, Kathleen Mang and myself -- is responsible for providing the structure and for selecting contributors. Winston's knowledge of the Copyright Office and the Congressional Research Service, Barbara's of Processing Services and the Automated Systems Office, and Kathy's of the Research Services Department enabled us to find contributors in almost every part of the Library.

Special acknowledgement and appreciation are given to the contributors themselves and to the editorial board; thanks also to the current and past LCPA Executive Committees, to Louis Drummond and Lee Avdoyan, President and Past-President of LCPA for their support and advice; to Tom Felt, Connie Johnson, R. Russell Neuswanger, Lee Avdoyan, and Louis Drummond for re-keying articles not submitted on Compucorp discs; to Peggy Pixley, Don Shomette, and Jack Early for their advice and assistance on the cover and title page; to Judy Krone, who gave me help on the technical aspects of camera-ready copy; to Peter Sparks, Felix Krayeski, Basil Manns, and Carolyn Morrow for providing photographs and explanations for the cover; to the production team extraordinaire, Victoria Hill and Diane Nester, who perservered for ten hours straight, and to Judith Farley who edited these words.

Suzanne E. Thorin
Editor

COMPUTERIZATION AT THE LIBRARY OF CONGRESS: THE FIRST TWENTY YEARS

Twenty-two years ago, the very patrician Senator Saltonstall leaned across a hearings table and said to Librarian of Congress Mumford, "I have had a continuing interest in the subject of mechanization of libraries ...[and] it is a subject that we could ask [you] to work on and possibly present as a part of [your] request to the Bureau of the Budget next year....As I understand it, it assists a person in getting information on a complicated subject or on any subject from a library. Just how, I am very frank to say, is completely over my head."

Librarian Mumford replied, "We have had an internal committee since early in 1958 studying what is being done in business and in industry and in government elsewhere...We are intensely interested in the matter and wish to progress as the means are available for doing this...[but] we realized that we must approach it cautiously, because the cost in equipment in this area is enormous, and we certainly do not wish to start junking our conventional methods of control of information." Mumford continued, "We are at the present time contemplating trying to assign one person to devote himself exclusively to this thing."

That one person became the thin edge of a mighty wedge.

Like so many things the Library of Congress does, its experience with automation closely parallels the experience of most of the nation's libraries; the major difference is simply size. The basic synopsis could well read: LC avoided computerization as long as possible, was intimidated into exploration, suddenly realized the potential, became fascinated and wildly hopeful, received the icy shock of reality, and has since been trying grimly to make it work among those day-to-day procedures where it seems genuinely appropriate.

Computerization at the Library of Congress has taken longer and cost more than even its worst enemy ever predicted, but it is finally in place and doing most of what it was promised, reasonably reliably.

Promises, Promises

The story begins in 1961. Using money from the Council on Library Resources, the Library hired a consultant firm to do a feasibility study to see if LC's operations were appropriate to automation. In 1962, to no one's surprise, the preliminary report said they were.

The survey was done by a team under Gilbert W. King and is therefore referred to as the King Report. It concluded that the process of computerization would be reasonably simple in terms of procedures, but something of a problem because of dimension. The team postulated that since each item was a tiny, finite block (the equivalent of a catalog card), each could be loaded into the computer and then controlled, added to, and recalled without complications.

The King Report pictured a system where one of these tiny, binary "documents" would be created when a book was ordered, expanded as it was cataloged, annotated as the monograph was charged in and out or sent for rebinding, and in general manipulated so as to reflect everything that happens to a book through it's lifetime in a library.

The theoreticians drew a verbal picture of LC's great reading room cleared of bulky card catalog cases. In their place would be dozens of desk-sized computer terminals before which readers would sit and ask questions: What is the call number for a particular book? Answer appears on the terminal's television tube: Z733.W38. How many books do you have on thus-and-such a subject? Answer: 150. Let me see those written in English, printed after 1950, that contain a bibliography. The tube shows a catalog card for each, one at a time, at the reader's command, and if he wants to retain the citation, he presses a button and a copy of the card slides out of the side of the machine for him to take with him. The King Report recommended a timetable that would bring all these magical visions to reality by 1972.

Described to the Library management with flip charts, plastic-bound prospecti, and ultimately, a hardbound summary report, the potential system was shown to have great flexibility and result in genuine economies for the Library of Congress. Even more, it was seen to hold even greater potential for American librarianship in general. The computer would hold in its memory not only the equivalent of the LC catalog, but the entire National Union Catalog as well. With this, the computer would indeed have a record of almost every item held in every library anywhere in North America.

Thus, all a library in Phoenix or Bangor would have to do was tell LC to add its symbol to the LC "card" for every book it got, and Phoenix or Bangor could throw away their catalogs, too. An Arizonian would ask the Phoenix computer terminal, what books do you have on thus-and-such, written in English, printed after 1950, with the symbol for the Phoenix Public Library on it, and the machine would work as well in Phoenix as in Washington. The cost of a rented telephone line was appreciable less than all the catalogers' salaries that could be eliminated.

Assured by the computer specialists that the system was feasible, LC went to work.

An Impossible Task

Work began with the building of the tiny block that represented a catalog card in the computer's memory. Recognizing that if the King Report was right, this block or document would some day be the basis for a worldwide bibliographic network, the Library designed it in close cooperation with all the major library groups.

Months of meetings involving representatives of the American Library Association, the Special Libraries Association, the Association of Research Libraries, the Committee on Scientific and Technical Information, the British National Bibliography, the International Atomic Energy Agency, the National Library of Medicine, and the National Agricultural Library produced a "format" known as MARC (pronounced "mark" and standing for MAchine-Readable Cataloging).

With the MARC established, LC began producing computer tapes containing all English-language books cataloged by LC and made these tapes available to sixteen carefully chosen libraries representing several different types. With the tapes went computer programs that would print out such basic products as individual

cards or book catalogs. Once the pilot program was shaken down, a refined MARC II was produced, and it is now the basic format at LC. Tapes were made available to any library, and by 1980 there were sixty-eight institutional subscribers, each buying a weekly 300-foot reel containing some thousand new records.

So far so good. But from this point on, almost nothing worked out as the computer industry had predicted. Through the 1960's literally dozens of computer hardware and software manufactures visited the library to get pieces of the action--in the hope that being in on the automation of the national library would open all other libraries to their product--only to withdraw, shaken by the immensity of what they found.

The original estimates had concentrated too heavily on how a reader would get information out of the computer, and too little on what it was going to take to get it in. They had failed to anticipate the multiplicity of printed characters that would be necessary, not to mention the fact that rather than being a finite size like a bank check, the "document" could run to many hundreds of characters; thus, there could be no uniform lengths or localities established in the finding programs for retrieval.

The complex relationships between order files, charge files, accession files, shelflist files, subject files, language files, and scores of others proved far more complex than originally expected. Similarly, the whole catalog had to be kept on line all the time. There was no way any part could be mounted on certain days of the week or any portion of the cards could be brought up in response to controlled demands. All eighteen million cards had to be ready to be searched at any time.

Through the sixties the contractors abandoned programs, broke agreements, and pilot study after pilot study seemed to disappear somewhere between start-up and delivery date. By the end of the decade, the Library had all but given up on out-of-house firms that time and again failed to understand how the data was actually created or how it was to be used.

In their place, LC built its own, in-house "Automated Systems Office," which today involves nearly two hundred people. The staff is a mixture of librarians who have been trained as computer specialists and computer technicians whom the Library has trained as librarians. And the system is working very well.

Locked Rooms With Computer Keys

The idea of a great computerized system of bibliographic cradle-to-grave information has been pushed back on the shelf, and LC is now automating specific chunks, one procedure or product at a time.

The computerized activity at the Library of Congress is slightly different than that traditionally perceived for a library. By convention, a library stores vast quantities of knowledge without trying to guess how it will be used. In most of LC's applications, however, blocks of knowledge have been identified and put aside for intensive manipulation by a specific audience for a recognized purpose. A valid metaphor might easily be a long corridor with rooms on either side. Each room is filled with different kinds of facts, and not only has the Library of Congress devised different keys to get into each room, but it has devised a single "skeleton" key to get into the files, cabinets, and closets within that room--but only that room.

Twenty-five years of experience proved that rather than design a master key that would make the entire eighty million pieces accessible, it was better to make different keys to do different things.

A Failure In Leadership?

Whenever the library profession is surveyed on their attitudes toward the Library of Congress, high on the list of hopes and disappointments comes "leadership," and there are few areas where hopes were higher than the desire for LC to break the trail in automation and technology. The expected target was for LC to provide an automated model that could be copied in various sizes from the Eureka Springs bookmobile to the Harvard Graduate School. As it worked out, it was all LC could do to get its own systems working, without even approaching a reproducible copy.

The failure to create a wider universe had many parts. Paramount was the fact that the Congress did not want its database accessed by everybody and expressly forbade LC to provide computer service to nongovernmental facilities. Similarly, while LC was struggling to get started, OCLC designed a truly inspired facility that served an ever-growing audience (at the time of this writing, OCLC supports some 4,000 members with a reported 20,000 additional organizations having access to its files). OCLC took most of the usual pressure off the Library of Congress to provide the service.

Once MARC was well established and the recent collections of the Library were digitalized and online, many people expected the Library to build a network of computer links throughout the country. Congress' reluctance impeded this, but even more, a variety of responsive regional and effective facilities had already come into existence. Any over-all network would threaten or erode their worlds, and a subtle resistance began to build not only to hold LC at arm's length, but even to joint or link with each other.

This is where things stand now. The idea of the Library of Congress heading a great network of bibliographic computers is seldom discussed by anyone any more. But the idea of LC providing the professional, high quality, authority-based bibliographic information for many networks and facilities is accepted and progressing.

The Future

That happens next? Work is now going forward to link various programs and data banks so a single key--a single set of commands, a single sign-on--will give access to more than one room. BOW TIE is a program under development that will bring portions of SCORPIO and MUMS together, making certain techniques and certain data simultaneously available from each program.

A second path enters the new world of videodiscs, where the entire book, motion picture, or manuscript is stored in laser/digital blips and brought on to the screen in the manner of a stop-frame television show. Although the videodisc technology is the model for the technique, the Library is exploring a far more

sophisticated form called the digital optical disk, which, it is now believed, will store the complete text of three thousand volumes on a single platter and thus have monumental impact on the preservation , the size of future libraries, and the potential for turning every library into a miniature Library of Congress.

And thus the first twenty years. The staff is in place, the skills are learned, and the targeting of energy and resources is now sharper than ever before. The next twenty years of LC automation should be both splendid and fascinating.

Charles Goodrum and Helen Dalrymple

[Reprinted with permission in an abridged version from the Wilson Library Bulletin, v. 57, October 1982, p. 115-121]

COMPUTERS, MANAGEMENT, AND THE FUTURE

Productivity is a subject of keen interest to managers. Until recently, increases in productivity have come from converting muscle work to machine work. When the Library of Congress' Jefferson Building opened in 1897, it incorporated the latest and fanciest of library machinery: pneumatic tubes and conveyor belts to retrieve books for use in the reading rooms. For more than sixty years, however, virtually no machines were installed to improve the efficiency of the basic plant, except for air coolers. Indeed, some recent changes were retrograde in a way. The present book conveyor system, for example, is slower than the one it replaced, although more far-reaching, in that it connects three buildings and is kinder to the books it carries.

New Machines

In the last twenty years machines to ease and speed muscle work have been joined by machines to ease and speed white collar work. We now have word-processors, photocopiers, computers, optical disk equipment, and electronic mail. Think of the work that in the last twenty years has felt the touch of new machines. In the sixties, we had an army of card filers; now we have an army of MARC inputters. Acquisitions, personnel, and budget records now are entered into a computer; data on congressional requests sluice around inside ISIS; readers do much if not most of their bibliographic searching on computer terminals.

Though we have come far, we are only in the first phase of our revolution. Our machines can do faster and better the same things that before, by and large, we did manually. But, we have created the library equivalent of the horseless carriage--an old fashioned carriage with a motor stuck on--not the modern automobile. We need to execute one of Thomas Kuhn's paradigm shifts. In his Structure of Scientific Revolutions Kuhn described how revolutionary advances in science entail discarding the old decrepit "paradigm" (or basic abstract model of the world) and replacing it by another that fits the facts of experience (or experiment) more closely. So it was that the Copernican model of the solar system displaced the Ptolemaic, and the Einsteinian universe displaced the Newtonian. From these fundamental shifts came innumerable changes throughout all science, each having their origin in the vision of the world that opened out from the new paradigm. So it follows that librarians must focus on the new reality brought us by electronic technology and start thinking not in terms of paper and cards, but of electronic information and culture--most particularly of how to exploit them to best serve the needs of our patrons.

New Jobs

Another challenge is even more immediate, the challenge of using the new technologies to increase staff output. Some new developments are understandably scary to staff. Despite the notorious reputation of the computer for increasing staff needs rather than reducing them, many in jobs affected by the computer worry that even if the number of jobs overall goes up the number of jobs they could fill might go down. This circumstance cries out for a fair, sensible, and reassuring response for management. We must alert staff early and well to all impending change. Most importantly, staff and management must cooperate in putting the new gadgetry to work. It is by now happily a cliché that our own people, our own staff, possess the unique knowledge and experience to provide the best advice and ideas on effecting change at the work site. A key challenge to managers is that of winning the confidence and full support of their staff so that all--the employee, the supervisor and the institution--can reap the harvest of ideas which staff, when challenged, supported, and heeded, has to offer. The Copyright Office has led the way in the increase of productivity through consultation with staff. By using a management matrix, the Optical Disk Pilot Program is another such success story.

Changes In Service

The second challenge of management is to revolutionize library service to patrons: to transform our horseless carriage into a modern Ferrari. If we are to do so, we must work as a team as we hurtle into an unpredictable future, a future that is a little worrying to all of us.

I believe that librarianship ideally aims to achieve instant access for all, anywhere, to all knowledge and preserved culture. Put aside for the moment the notion that if we achieve the ideal we might have placed ourselves in the nightmare of a certain Borges story that describes a people so oppressed by the ready access to all knowledge and thought that ultimately the people rise up and obliterate the Universal Library. Put aside also the thought that ready, free access to information and culture will devalue it to the degree that it is utterly ignored, like the keenly awaited book which, when bought, languishes forever on the shelf unread.

To improve service in a way that exploits the new technology is to exploit the computer, telecommunications, and gigamass storage devices (like optical disks) so as to transform "libraries" from a place into a "pure" service. If the information or work of literature or art (including precise representations of the printed page or an elegant electronic successor to the printed page) is available in digital form, then that item is almost infinitely transportable. It does not defy reason to expect that the electronic "book" of the future will be as portable, convenient, practical, handsome, and lovable

There was simply no perfect solution to the problems. We had learned the questions to ask, had suggested the files and approaches, recommended a centralized large-scale operation that would keep costly duplication to a minimum through coordinated efforts, developed FR programs that were useful but had problems, had described levels of description that were required, and recommended establishing some agency to coordinate large-scale conversion.

Other Projects

Nothing happened, though CLR expressed continuing interest in various means for exchanging records. In LC during the 1970's and 1980's there were experiments with a number of projects that would have implications for recon. COMARC, a project for testing the feasibility of sharing the labor of creating machine records, ended in 1978 after nearly 40,000 machine records were created by libraries other than LC for items outside the scope of MARC, but that had an existing LC manual cataloging record. We learned that following LC procedures outside LC can be difficult, and that without validation against authorities, verification and correction of records is just as expensive as doing the conversion in LC.

Having begun to put currently created name authority records into machine form in 1977, in 1978 LC began to includein these records data for headings as they would be established under AACR2 beginning in 1981. And, in 1980-81 in preparation for AACR2, LC and CLR worked to convert heavily-used retrospective name headings into machine form, thereby enhancing the prospects for authorities to be used later in bibliographic conversions.

During 1981 and 1982 a report was prepared specifying machine methods for updating pre-AACR2 records to AACR2 forms through the use of the online name authority file. (Bibflip, 1982) Such a project, of course, would be a conversion of a different sort than has been emphasized here, that is a conversion of fields in records already in machine form. The programs could be helpful later, however, if non-MARC records ever were automated in their original form. This machine project never came to pass, as LC chose instead to do such a flip manually with contracted staff beginning in fall, 1983.

Finally, there is the University of Chicago cooperative project, begun in 1983 to create nearly 40,000 retrospective bibliographic and name authority records. The University of Chicago now has direct access to LOCIS for inputting and updating records in science and medicine, records selected from LC non-MARC items. Chicago not only is inputting the records, but also upgrading descriptive access points to AACR2 and subject access points to LCSH. The project is part of a larger CODABASE (Cooperative Databases Building System) program under way in LC that allows contributions to LC files by mail and, in limited cases, by terminal.

PreMARC

Then we have PreMARC, the largest project of them all and the third method by which LC is approaching recon. In January 1980 LC agreed to buy from Carrollton Press, Inc. (CP) machine bibliographic records that were keyed by CP from a hard-copy blowback of a microfiche version of several LC card shelflists. The fiche snapshot of the shelflists had been prepared between April 1978 and September 1979 by University Microfilms, Inc. and Historical Documents, Inc., the latter an organization related to CP. The Library states in its 1980 annual report that the "converted LC records...will be used to support LC staff and readers and in the cataloging, shelflisting, and card production operations." (Library 1981, 57) Several years later there were two additional explicit statements that PreMARC was the file of record. In a 1984 report a PreMARC Database Planning Group states that although PreMARC "was originally conceived as an adjunct to the Main Catalog...recent events, especially the plans for the restoration of the Jefferson Building, have changed this concept, making the PreMARC database the primary file for the use of the older collections," and later that "the Premarc database is the 'official' file for the records it contains and must be upgraded to reflect the most current information about each item represented." (Library 1984, i,11) And, in a memorandum to the Deputy Librarian of Congress in 1985, the Assistant Librarian for Processing Services states that all future updates on non-MARC records should be done on PreMARC once input/update capability is available, that no changes should be made to the official or main card catalogs. (Avram 1985)

Will Pre-MARC Work?

Is PreMARC now capable of this responsibility as catalog of record and do the plans to upgrade PreMARC make it capable? No, on both counts.

As suggested in the contract signed by LC and CP in 1980, PreMARC was never intended to be a catalog of record. If we look at the questions addressed in the projects of the late 1960's and early 1970's, we see that PreMARC cannot reasonable fulfill any of the goals implied. The base file is several LC card shelflists (general, atlas, maps, music), MARC cards excluded; the shelflists do not contain records for all cataloged items in these formats. Notably absent are the numerous pre-1898 "paste-on" cards in the Main Catalog, unclassified law, nearly 200,000 non-romanized records, nearly 30,000 music records, over 100,000 priority 4 records with partial cataloging, 30,000 rare pamphlets, and some records from the "official author catalogue" begun in 1865. Some of these records are being included in a PreMARC II project. But, in fact, there is still no single catalog in book or card form that reflects all the monographic holdings of LC, not to mention other formats. In terms of scope, PreMARC leaves much to be desired.

In levels of cataloging description PreMARC also falls short. At thirty-seven cents a record, LC agreed with CP to key selected fields; although these represent most primary access points, notably absent are Dewey numbers, untraced series, many second call numbers, and all title field data beyond the first thought, which often results in leaving out editors, translators, edition notes, subtitles, all of which are bibliographic elements crucial for making acquisitions, cataloging, reference, and loan decisions. In terms of machine standards consistent with current cataloging efforts, PreMARC reveals serious problems, as the weaknesses of format recognition have become readily apparent. Errors already present on printed cards, keying errors often made due to the illegible third-generation blowback of the fiche, and differences in cataloging conventions represented in PreMARC, wreak havoc with FR, thereby leaving fields mistagged with serious negative impact on retrieval. Over 50 percent

of the 4.5 million records in PreMARC have errors, many of them significant for retrieval for any library purposes. Last but not least, PreMARC records have the subject headings assigned when an item was initially cataloged; no changes are made to these fields, though the changes are reflected in some other catalogs. Subject searching through PreMARC, whether for readers, catalogers, or card production, requires consulting nine editions of LCSH.

Necessary Upgrades

In accordance with its initial recommendations in the 1970's, with PreMARC LC has embarked on a centralized large-scale recon effort. It is clear that despite its problems, PreMARC represents significant searching advantages by being available online through LOCIS. Quite simply, the file may be searched in many ways impossible in a card catalog. But the problems identified above will persist until an adequate upgrade project is supported and implemented to make PreMARC the file it is stated to be, though not initially intended to be. The 1984 PreMARC Database Planning Group identifies eight upgrade methods and supports four for key fields only. A subsequent 1985 report by the Research Services Department identifies three levels of upgrade for improving the quality of records and several catalogs to be used to enhance the scope of the file. (Library 1985, 3,5)

In the spring of 1985 several simulation studies were completed to determine the resources required for these various upgrades, doing PreMARC alone or as part of other projects. Upgrading 150,000 PreMARC records alone each year would require from 7 to 14 staff, depending on the level of the upgrade. Combining PreMARC with other preservation and inventory control projects would require 10 to 17 staff for the same number of records. Clearly, there would be advantages to combining the projects, even though in either case we are looking at a twenty-year time span should LC go it alone. A proposal to consolidate the three projects (but to correct and fill out only five key fields: call number, copy call number, main entry, title, card number) was received favorably by senior LC management, but will not be proposed to Congress before FY88 requests go forward. Funding for preparation work before FY88 has not been approved in LC; such work could have included large offline searches of the file to identify records with known problems as well as other advance maintenance. However, beginning in 1986 LC will be able to update error records that are reported by LC staff, and will correct only the specific errors that are reported.

Though PreMARC "represents the best opportunity to bring the Library's catalogs into a single integrated source," clearly that will not be done. (Library 1985, 5) And, features in the LC/CP contract impose further restrictions; until the year 2005 LC cannot distribute more than 15,000 upgraded records annually, a limitation Richard DeGennaro says "can be regarded as one of the 'seven blunders' of the library world." (Retrospective 1984, 56) and which could have implications for assistance other libraries could offer in cooperative projects for upgrading PreMARC. In recent months recon questions have received even more attention: CLR and the Association of Research Libraries are working together on a two-year pilot project to synchronize conversion of collections by subject, and research is moving forward on the use of improved technologies such as optical disk and optical character recognition. Whether librarians believe a high quality national retrospective database created in a coordinated fashion is still possible or desirable, it is certainly viable with PreMARC as one major source; despite its shortcomings, PreMARC and the files in LC that can be used to enhance it represent only ignoring its own wisdom, but also losing a rare opportunity: in one project the Library could fulfill the needs of its staff and researchers and, at the same time, assist libraries that in the past looked to it and depended on it for bibliographic leadership.

Linda Arret
General Reading Rooms Division

SELECTED REFERENCES

Avram, Henriette D. (1985) "Recommendations for a Core Official Catalog," memorandum to William J. Welsh, Deputy Librarian of Congress. February 25, 1985. Washington, D.C.: Library of Congress, Processing Services Department, 1985.

Avram, Henriette D. (1972) Recon Pilot Project; Final Report on a Project Sponsored by the Library of Congress, The Council on Library Resources, Inc., and the U.S. Dept. of Health, Education, and Welfare, Office of Education. Washington, D.C.: Library of Congress, 1972.

Bibliographic Flip: Requirements for Conversion of Bibliographic Data for AACR 2. (1982) Ed. Jo Calk, April 1982. Washington D.C.: Library of Congress, Processing Services Department, 1982.

Crismond, Linda F. (1981) "Quality Issues in Retrospective Conversion Projects," LRTS vol. 25, no. 1 (January/March 1981), pp. 48-55.

Library of Congress. (1981) Annual Report of the Librarian of Congress for the Fiscal Year Ending September 30, 1980. Washington, D.C.: Library of Congress, 1981.

Library of Congress. Premarc Database Planning Group. (1984) Report. ed. Lucia Rather, December 1984. Washington, D.C.: Library of Congress, Processing Services Department, 1984.

Library of Congress. Research Services Department. Ad Hoc Group on Premarc. (1985) Enhancing Premarc. ed. Linda Arret, March 1985. Washington, D.C.: Library of Congress, Research Services Department, 1985.

"Recon Roundup," American Libraries, vol. 16, no. 10(November 1985), p. 700.

Recon Working Task Force. (1969) Conversion of Retrospective Catalog Records to Machine-Readable Form: A Study of the Feasibility of a National Bibliographic Service. Washington, D.C.: Library of Congress, 1969.

Recon Working Task Force. (1973) National Aspects of Creating and Using MARC/RECON Records. Washington, D.C.: Library of Congress, 1973.

Reed-Scott, Jutta. "Retrospective Conversion: An Update," American Libraries, vol. 16, no. 10 (November 1985), pp. 694-698.

Retrospective Conversion: Report of a Meeting Sponsored by the Council on Library Resources. (1984) July 16-18, Wayzata, Minnesota. Compiled and edited by Dorothy Gregor. Washington, D.C.: Council on Library Resources, 1984.

There was simply no perfect solution to the problems. We had learned the questions to ask, had suggested the files and approaches, recommended a centralized large-scale operation that would keep costly duplication to a minimum through coordinated efforts, developed FR programs that were useful but had problems, had described levels of description that were required, and recommended establishing some agency to coordinate large-scale conversion.

Other Projects

Nothing happened, though CLR expressed continuing interest in various means for exchanging records. In LC during the 1970's and 1980's there were experiments with a number of projects that would have implications for recon. COMARC, a project for testing the feasibility of sharing the labor of creating machine records, ended in 1978 after nearly 40,000 machine records were created by libraries other than LC for items outside the scope of MARC, but that had an existing LC manual cataloging record. We learned that following LC procedures outside LC can be difficult, and that without validation against authorities, verification and correction of records is just as expensive as doing the conversion in LC.

Having begun to put currently created name authority records into machine form in 1977, in 1978 LC began to includein these records data for headings as they would be established under AACR2 beginning in 1981. And, in 1980-81 in preparation for AACR2, LC and CLR worked to convert heavily-used retrospective name headings into machine form, thereby enhancing the prospects for authorities to be used later in bibliographic conversions.

During 1981 and 1982 a report was prepared specifying machine methods for updating pre-AACR2 records to AACR2 forms through the use of the online name authority file. (Bibflip, 1982) Such a project, of course, would be a conversion of a different sort than has been emphasized here, that is a conversion of fields in records already in machine form. The programs could be helpful later, however, if non-MARC records ever were automated in their original form. This machine project never came to pass, as LC chose instead to do such a flip manually with contracted staff beginning in fall, 1983.

Finally, there is the University of Chicago cooperative project, begun in 1983 to create nearly 40,000 retrospective bibliographic and name authority records. The University of Chicago now has direct access to LOCIS for inputting and updating records in science and medicine, records selected from LC non-MARC items. Chicago not only is inputting the records, but also upgrading descriptive access points to AACR2 and subject access points to LCSH. The project is part of a larger CODABASE (Cooperative Databases Building System) program under way in LC that allows contributions to LC files by mail and, in limited cases, by terminal.

PreMARC

Then we have PreMARC, the largest project of them all and the third method by which LC is approaching recon. In January 1980 LC agreed to buy from Carrollton Press, Inc. (CP) machine bibliographic records that were keyed by CP from a hard-copy blowback of a microfiche version of several LC card shelflists. The fiche snapshot of the shelflists had been prepared between April 1978 and September 1979 by University Microfilms, Inc. and Historical Documents, Inc., the latter an organization related to CP. The Library states in its 1980 annual report that the "converted LC records...will be used to support LC staff and readers and in the cataloging, shelflisting, and card production operations." (Library 1981, 57) Several years later there were two additional explicit statements that PreMARC was the file of record. In a 1984 report a PreMARC Database Planning Group states that although PreMARC "was originally conceived as an adjunct to the Main Catalog...recent events, especially the plans for the restoration of the Jefferson Building, have changed this concept, making the PreMARC database the primary file for the use of the older collections," and later that "the Premarc database is the 'official' file for the records it contains and must be upgraded to reflect the most current information about each item represented." (Library 1984, i,11) And, in a memorandum to the Deputy Librarian of Congress in 1985, the Assistant Librarian for Processing Services states that all future updates on non-MARC records should be done on PreMARC once input/update capability is available, that no changes should be made to the official or main card catalogs. (Avram 1985)

Will Pre-MARC Work?

Is PreMARC now capable of this responsibility as catalog of record and do the plans to upgrade PreMARC make it capable? No, on both counts.

As suggested in the contract signed by LC and CP in 1980, PreMARC was never intended to be a catalog of record. If we look at the questions addressed in the projects of the late 1960's and early 1970's, we see that PreMARC cannot reasonable fulfill any of the goals implied. The base file is several LC card shelflists (general, atlas, maps, music), MARC cards excluded; the shelflists do not contain records for all cataloged items in these formats. Notably absent are the numerous pre-1898 "paste-on" cards in the Main Catalog, unclassified law, nearly 200,000 non-romanized records, nearly 30,000 music records, over 100,000 priority 4 records with partial cataloging, 30,000 rare pamphlets, and some records from the "official author catalogue" begun in 1865. Some of these records are being included in a PreMARC II project. But, in fact, there is still no single catalog in book or card form that reflects all the monographic holdings of LC, not to mention other formats. In terms of scope, PreMARC leaves much to be desired.

In levels of cataloging description PreMARC also falls short. At thirty-seven cents a record, LC agreed with CP to key selected fields; although these represent most primary access points, notably absent are Dewey numbers, untraced series, many second call numbers, and all title field data beyond the first thought, which often results in leaving out editors, translators, edition notes, subtitles, all of which are bibliographic elements crucial for making acquisitions, cataloging, reference, and loan decisions. In terms of machine standards consistent with current cataloging efforts, PreMARC reveals serious problems, as the weaknesses of format recognition have become readily apparent. Errors already present on printed cards, keying errors often made due to the illegible third-generation blowback of the fiche, and differences in cataloging conventions represented in PreMARC, wreak havoc with FR, thereby leaving fields mistagged with serious negative impact on retrieval. Over 50 percent

of the 4.5 million records in PreMARC have errors, many of them significant for retrieval for any library purposes. Last but not least, PreMARC records have the subject headings assigned when an item was initially cataloged; no changes are made to these fields, though the changes are reflected in some other catalogs. Subject searching through PreMARC, whether for readers, catalogers, or card production, requires consulting nine editions of LCSH.

Necessary Upgrades

In accordance with its initial recommendations in the 1970's, with PreMARC LC has embarked on a centralized large-scale recon effort. It is clear that despite its problems, PreMARC represents significant searching advantages by being available online through LOCIS. Quite simply, the file may be searched in many ways impossible in a card catalog. But the problems identified above will persist until an adequate upgrade project is supported and implemented to make PreMARC the file it is stated to be, though not initially intended to be. The 1984 PreMARC Database Planning Group identifies eight upgrade methods and supports four for key fields only. A subsequent 1985 report by the Research Services Department identifies three levels of upgrade for improving the quality of records and several catalogs to be used to enhance the scope of the file. (Library 1985, 3,5)

In the spring of 1985 several simulation studies were completed to determine the resources required for these various upgrades, doing PreMARC alone or as part of other projects. Upgrading 150,000 PreMARC records alone each year would require from 7 to 14 staff, depending on the level of the upgrade. Combining PreMARC with other preservation and inventory control projects would require 10 to 17 staff for the same number of records. Clearly, there would be advantages to combining the projects, even though in either case we are looking at a twenty-year time span should LC go it alone. A proposal to consolidate the three projects (but to correct and fill out only five key fields: call number, copy call number, main entry, title, card number) was received favorably by senior LC management, but will not be proposed to Congress before FY88 requests go forward. Funding for preparation work before FY88 has not been approved in LC; such work could have included large offline searches of the file to identify records with known problems as well as other advance maintenance. However, beginning in 1986 LC will be able to update error records that are reported by LC staff, and will correct only the specific errors that are reported.

Though PreMARC "represents the best opportunity to bring the Library's catalogs into a single integrated source," clearly that will not be done. (Library 1985, 5) And, features in the LC/CP contract impose further restrictions; until the year 2005 LC cannot distribute more than 15,000 upgraded records annually, a limitation Richard DeGennaro says "can be regarded as one of the 'seven blunders' of the library world." (Retrospective 1984, 56) and which could have implications for assistance other libraries could offer in cooperative projects for upgrading PreMARC. In recent months recon questions have received even more attention: CLR and the Association of Research Libraries are working together on a two-year pilot project to synchronize conversion of collections by subject, and research is moving forward on the use of improved technologies such as optical disk and optical character recognition. Whether librarians believe a high quality national retrospective database created in a coordinated fashion is still possible or desirable, it is certainly viable with PreMARC as one major source; despite its shortcomings, PreMARC and the files in LC that can be used to enhance it represent only ignoring its own wisdom, but also losing a rare opportunity: in one project the Library could fulfill the needs of its staff and researchers and, at the same time, assist libraries that in the past looked to it and depended on it for bibliographic leadership.

Linda Arret
General Reading Rooms Division

SELECTED REFERENCES

Avram, Henriette D. (1985) "Recommendations for a Core Official Catalog," memorandum to William J. Welsh, Deputy Librarian of Congress. February 25, 1985. Washington, D.C.: Library of Congress, Processing Services Department, 1985.

Avram, Henriette D. (1972) Recon Pilot Project; Final Report on a Project Sponsored by the Library of Congress, The Council on Library Resources, Inc., and the U.S. Dept. of Health, Education, and Welfare, Office of Education. Washington, D.C.: Library of Congress, 1972.

Bibliographic Flip: Requirements for Conversion of Bibliographic Data for AACR 2. (1982) Ed. Jo Calk, April 1982. Washington D.C.: Library of Congress, Processing Services Department, 1982.

Crismond, Linda F. (1981) "Quality Issues in Retrospective Conversion Projects," LRTS vol. 25, no. 1 (January/March 1981), pp. 48-55.

Library of Congress. (1981) Annual Report of the Librarian of Congress for the Fiscal Year Ending September 30, 1980. Washington, D.C.: Library of Congress, 1981.

Library of Congress. Premarc Database Planning Group. (1984) Report. ed. Lucia Rather, December 1984. Washington, D.C.: Library of Congress, Processing Services Department, 1984.

Library of Congress. Research Services Department. Ad Hoc Group on Premarc. (1985) Enhancing Premarc. ed. Linda Arret, March 1985. Washington, D.C.: Library of Congress, Research Services Department, 1985.

"Recon Roundup," American Libraries, vol. 16, no. 10(November 1985), p. 700.

Recon Working Task Force. (1969) Conversion of Retrospective Catalog Records to Machine-Readable Form: A Study of the Feasibility of a National Bibliographic Service. Washington, D.C.: Library of Congress, 1969.

Recon Working Task Force. (1973) National Aspects of Creating and Using MARC/RECON Records. Washington, D.C.: Library of Congress, 1973.

Reed-Scott, Jutta. "Retrospective Conversion: An Update," American Libraries, vol. 16, no. 10 (November 1985), pp. 694-698.

Retrospective Conversion: Report of a Meeting Sponsored by the Council on Library Resources. (1984) July 16-18, Wayzata, Minnesota. Compiled and edited by Dorothy Gregor. Washington, D.C.: Council on Library Resources, 1984.

AUTOMATION AND LCSH

The first edition of the Library of Congress subject heading list was issued in parts from 1909 to 1914 under the title Subject Headings Used in the Dictionary Catalogues of the Library of Congress. New editions and supplements appeared subsequently at irregular intervals.

As the list grew larger and more complex, it became necessary to change from a 7x10, one-column format to a 9x11, three-column format and smaller type in order to keep the volumes to a reasonable size. The increase in size also increased the amount of time necessary to prepare the list for publication. The manual methods used to produce the 5th edition, for example, consisted of cutting the type lines from the 4th edition and its supplements into strips, gluing the strips to cards, then interfiling and editing the cards. This process began in November 1946 and was finished in August 1947 with a final total of 60,000 cards. The cards were sent to the Government Printing Office in batches starting in June 1947. The Government Printing Office produced the first galley proofs of the list in August 1947 and the last in January 1948. After proofing, the galley proofs were returned to the Government Printing Office, which then produced page proofs. The last corrected page proofs were returned to the Government Printing Office in September 1948. The total time consumed in producing the 5th edition, therefore, amounted to about two years.

Automation Introduced

Some automated procedures were introduced in the production of the 7th edition of the subject heading list. The 6th edition and its supplements were cut into strips, mounted on cards, and sent to GPO as usual. At GPO, however, format codes for each item were assigned by the keyboard operator and the data was input on a machine which produced a perforated paper tape. Using the paper tape, the data was input into a computer which generated locator numbers for each line. These locator numbers enabled the computer to sort and interfile supplements with the main edition. The computer then produced another paper tape which drove the photocomposing machine to produce pages for the new edition.

It was intended that these techniques be continued. According to the Introduction to the 7th edition: "When the supplement for July 1964-December 1965 has been converted to machine-readable form, the basis will have been laid for automatic production of a single cumulated supplement to the seventh edition of the list and in due course for production of the eighth edition by the same means. Elimination of repetitive composition and proofreading operations afforded by these techniques is expected to result in more rapid production of future major cumulations and new editions of the list." Unfortunately this goal was not attained; as stated in the Preface to the 8th edition: "When the seventh edition (1966) of the present work ...was printed by photocomposition from computer-produced tape, it was hoped that a base had been developed into which subsequent supplements could be merged and a new edition published in a relatively short time when needed. Technical shortcomings quickly made it evident that this hope was an oversimplification. Finally, it was decided that the only approach to a new edition was that of reformatting the seventh edition and each supplement through 1972 with a consequent merge of all pieces into one list. This large task was assigned to the MARC Development Office of the Library of Congress and the Editorial Section of the Subject Cataloging Division."

Maintenance in Machine-Readable Form

In 1970 the MARC Development Office began designing a system for the input, maintenance, and updating of subject headings in machine-readable form. This system was to incorporate the machine-readable data comprising the 7th edition and its supplements, which were prepared by the Government Printing Office for the photocomposition system. The data from the 7th edition and each supplement in turn was converted from the GPO format into the new format. The data was then printed out and proofread by staff of the Subject Headings Editorial Section. Corrections were input and run against the master file. As the supplements were converted, they were merged with the master file. Using this new system, subject headings through 1972 were merged into one file, and the 8th edition appeared in 1975.

This new system was then used to input data for supplements beginning with the January-March 1973 supplement. The data was input using an ATS (Administrative Terminal System) terminal and merged using batch processing. The result of this processing was a magnetic tape used to run the Library's electronic photocomposition system, which in turn prepared the data for printing. Each quarter's data was input separately and later merged to produce the cumulated supplement. At the end of the year, the four quarters were merged with the master file.

Input of data to the automated system was done after the weekly editorial meeting, which required a double keying of the data: once for the tentative weekly list and again for input to the automated system. In 1975 an enhancement to the automated system was introduced, which allowed the data to be input once via the ATS terminal and the tentative weekly list to be produced by the automated batch system. This first enhancement still required the input of reciprocal references after the editorial meeting; a later enhancement introduced a routine which automatically generated the reciprocal references. Another change in procedure introduced later was merging the data a week at a time into the yearly supplement file, rather than a quarter at a time. This is the system that is currently being used to produce the weekly lists, quarterly supplements, and new editions of LCSH.

Changes in Format

The introduction of the new system was not without impact on the data. As stated in the Introduction to the January-March 1973 supplement: "The rules for LC subject headings remain generally unaltered, but automation has resulted in several changes in content and arrangement of material. ...Owing to the need for efficient arrangement of bibliographic entries by computer, a new set of filing rules has been followed. ...Although the new rules retain features of systematic arrangement found in manually produced LC catalogs, they differ significantly in that a basic principle is to file a heading strictly as expressed in its written form, word by word." The application of this basic principle affected a number of situations: numbers expressed in digits are filed preceding alphabetic characters and are arranged according to increase in numeric value rather than arranged alphabetically according to their verbal equivalent; abbreviations

such as St. (Saint) and Mt. (Mount) are filed as they look rather than according to their spelled-out version. Another change required by the automated system was in period subdivisions. Some subdivisions representing historical periods under place or topical headings which were previously filed in a chronological sequence could not easily be handled by computer because the periods were not in numeric form. All of these subdivisions were changed in the eighth edition by substituting or adding explicit dates: for example, UNITED STATES--HISTORY--CIVIL WAR was changed to UNITED STATES--HISTORY--CIVIL WAR, 1861-1865. The automated system also introduced a change in the arrangement of period subdivisions. Period subdivisions beginning with the same date and ending with various dates were previously filed with the broadest period first. Since the new filing system follows a numeric progression, the shortest period is now filed first. And finally, the new filing rules caused inverted headings to file ahead of headings with parenthetical qualifiers; for example, in the new system the heading CHILDREN, ADOPTED files ahead of CHILDREN (ROMAN LAW), whereas in the old system the order was the reverse.

The current automated system has several advantages over the old manual system. Data is proofread at the time of input, and since it is not rekeyed for supplements or new editions, it need not be proofread again; this reduces considerably the time needed to produce supplements and new editions. For instance, the processing time for the 9th edition was about nine months as contrasted to the two years required for the 5th edition. Another advantage of the automated system is that there is no need to code for type style, indentations, or other elements of format; all formatting is done automatically by computer program.

Disadvantages

The current system has several disadvantages. All processing is carried out in batch mode, making correction procedures cumbersome. These procedures often require several runs (with proofreading of hard copy for each run) in order to complete a small number of corrections. Another disadvantage that has been encountered involves the use of the LIBSKED (Library Sort Key Edit) program, which is an integral part of all processing in the current system. The use of this program places some limitations on the data that can be input. For instance, hyphens are considered to be the same as spaces, and diacritic marks and apostrophes are ignored. This means that it is not possible to make a see reference from "O'Connor family" to "Oconnor family"; the computer program considers these to be the same string and will not allow both. Another disadvantage has to do with the relative age of the current system. Most of the current system was developed more than ten years ago, and the documentation of the programs is not extensive. This situation makes analyzing errors and devising solutions to problems often a case of trial and error.

Online Availability

A new system for the online input and update of subject headings is being developed. This system will parallel the existing system for input and update of name authority records in most respects. It is expected that this new system will eliminate most of the disadvantages of the current system and will provide the additional advantage of an online search and retrieval capability not available in the current system. The projected implementation date for this new system is the end of 1985.

Mary Lou Miller
Subject Cataloging Division

SERIALS AUTOMATION: THE USERS' PERSPECTIVE

The Library of Congress subscribes to a mission fundamental to all libraries: serving the user. In addition to serving its direct user clientele, LC also has the goal of helping other libraries serve their users. Automation support has become an invaluable tool in both efforts. In this paper, we will examine how automation has helped and will help LC's own users (both patrons and employees) learn about and obtain desired issues or volumes of serials. We are taking a local LC user perspective both in the interest of brevity and because of our assumption that the efforts to help LC's direct users also will accrue to other libraries attempting to help their users.

The questions asked by LC serial users can be reduced to three: Is there a serial which meets my needs? Does LC have the serial? Is the serial immediately available to me?

Is There a Serial Which Meets My Needs?

Reliable bibliographic data is fundamental to the user seeking to determine whether or not there is a serial. Happily, our main area of success in the automation of serials activities--indeed our main area of automated endeavor--has been that of creating machine-readable records containing descriptive and subject cataloging data, and most recently, abstracting and indexing coverage data. These are the records rich in identifying information about the publication *per se*, as well as what can be called the publication's analyzable attributes.

The creating of these records has been accomplished through the CONSER (Conversion of Serials) Project, a ten-year collaborative effort by several dozen institutions to convert existing (now, more commonly, to create directly online) cataloging information for the world's serial publications. The online union catalog of OCLC, Inc. is the host data base for the project. The CONSER file has in excess of 550,000 records, approximately half of which have been "authenticated."

Although not immediately apparent to the average user, the authentication process is extremely important in ensuring the timeliness, fullness, and accuracy of the bibliographic records available to the user. Authentication signals the type of review all or parts of a record have received. Another important feature is that it governs whether a record is sent to LC as part of the weekly distribution of CONSER records from OCLC. Until quite recently, only LC and the National

Library of Canada and their International Serials Data System offices had the ability to authenticate a record. Not surprisingly, many records were unavailable within LC and to the MARC Distribution Service subscribers because the "funnel" for performing the authentication process was too small when compared with the number of records created by project participants.

As a means of expediting the effort of record authentication and distribution and the preparation of products deriving from the CONSER data base, project participants now have the opportunity to perform authentication of records they have completed. As a result of sharing the authentication and maintenance responsibilities, the CONSER file is growing in the number of records and the timely maintenance of the content of the records.

The Linked System Project (LSP) may provide yet another avenue in the future for expediting the bibliographic record creation and distribution process. A CONSER/LSP application would permit daily online exchange of newly created or updated records between the computer systems of cooperating institutions. It is foreseen that such major facilities as LC, OCLC, RLIN, and WLN could coordinate their files. In this way, LSP, also, would contribute to the growth and maintenance of serial cataloging records within LC.

While a boon in most quarters, a bigger and better CONSER file has some drawbacks in terms of how the records are presented in MUMS. Internally, the CONSER file is the serials file. Not all of these records are held by LC, nor are those which are held always clearly marked with their call number or location. This predicament leads us to our next user question.

Does LC Have The Issue?

Once armed with the bibliographic data, our user's immediate question is: Does LC have the item? Automation holds the promise of giving a quick, reliable response.

Within the CONSER Project, the US Newspaper Program alone supports machine-readable records of actual holdings. Local data records on OCLC are used to reflect the kind and the extent of issues held by participating institutions, including LC. All holdings for an item are appended to a single bibliographic record which reflects cataloging as if the item were the singular, original form of issue. The user is conveniently served by being able to view a chronology of holdings (whether in ink print, microfilm, etc.) without having to carom from bibliographic record to bibliographic record in an attempt to piece together holdings under a particular title.

Apart from newspaper records, it is often difficult to determine what LC holds of the titles represented by the CONSER records and in what form, much less which titles pass through the LC processing flow, but do not remain part of the collection. Currently, if users rely on the CONSER records made available through MUMS, at times they will be misled as to whether the item is held by LC. There are cases for which LC may hold a title, but the system automatically generates an unequivocal "NOT IN LC COLLECTION" header message. This problem occurs because as CONSER participants are adding records to the file that reflect their holdings of the title, the records have not yet been checked against LC holdings and the system assumes as a default option that the item is not in the LC collection. One should approach such a record with the assumption that LC indeed may hold the title and a reference librarian should be asked to telephone the Serial Record Division for confirmation.

As for other "Does LC have it?" efforts, a new application, called SERLOC, has been added to MUMS which provides a mechanism to help begin the complex process of converting data elements from the manual holdings files maintained by the Serial Record Division into machine readable form. SERLOC (a versatile acronym: Serials Locations; or, Serials, Library of Congress) is in operation, and the conversion keying has begun already.

A selection of data elements such as serial record entry, call number, purchase order number, and retention decision were identified for inclusion in SERLOC. These elements are essential in forming a multi-purpose core inventory record for the Serials Management System application (discussed below); they are also essential for expressing certain data about the item's status relative to LC's collection which cannot be carried in the bibliographic record.

Although SERLOC records are designed to be the foundation for the yet to be developed automated inventory record, in the interim they give a Library-wide glimpse of the serial retention decisions, as well as the extent of our holdings on a title level (i.e., does LC have the item at all?). By virtue of being recorded in SERLOC, the status of many titles not retained will be made known (e.g., "Send unchecked to NLM"). Given the variety of powerful search keys available through MUMS, access to serials holdings will be exponentially improved, even though the detailed holdings information still resides in the manual files. The SERLOC record will point to the form of entry in the manual holdings file, helping overcome the obvious inadequacies of the single-entry approach to most holdings records. SERLOC also provides the potential of serving an APIF-like function for serials flowing through the processing stream.

Having settled the question of whether or not LC is likely to have the title, the pressing concern of the user then becomes that of actually obtaining the piece sought.

Is The Issue Available?

The most promising avenue under exploration for achieving our goal of successfully delivering serials to users lies in the evolving Library-wide serials management system (SMS). The SMS will focus on receipts, inventory, and physical collection control aspects of LC's serials automation potential. It is anticipated that development of the SMS will span a six to eight year time period. Resulting conversion activities, which will involve conversion of over fifty manual serials check-in files (as well as the growing SERLOC file) and, ultimately, encoding of some two million active and inactive check-in records, could span over twenty years. Yet further would be the conversion of binding and other serials control files.

This system will be designed to do more than provide an automated mechanism for recording serial holdings at the issue or piece level. It will attempt to unite and make more efficient the description of the Library's physical holding of serial material and unite

that information with the bibliographic information systems that are already in place. Further, this system will help us bridge the "inventory gap," by aiding the process of comparing what we once had with what we now have. In the process, we will finally acquire in machine-readable form a collective picture of the Library's total population of serial titles and holdings. By offering an automated, distributed system to control this process, we can continue to allow multiple receipt locations for serials, but add the advantage of uniting all data about serials on one common machine-based file to which anyone can have access.

For the first time, LC would have a reliable system that would automatically provide an alert when a subscription either goes astray or stops arriving altogether. By this process we can ensure full value from all acquisition sources and save considerable yearly expenditures in acquiring replacement issues that we otherwise could have claimed in time. This uniting of information about our serials collection will help guide personnel responsible for the selection and building of the serial collection, and help prevent duplication in ordering.

As a step in ending user frustration with items "Not on Shelf," binding functions also will be included in the SMS. Linked to the check-in receipt function, it will be possible to predict for active titles on a subscription level the appropriate binding intervals and then to track the binding process. One can imagine that certain high-use serials could have binding scheduled in such a way as to ensure that loose issues remain available during their period of greatest demand, while at the same time not sacrificing the chance of assembling a full volume before the issues go astray.

The Optical Disk Pilot Project is one effort which holds the promise of ensuring, among other aims, that issues are never "Not on Shelf." A small number of popular serial titles have been digitized and recorded on optical disk. An indexing approach to the file has been developed to retrieve information contained on the disks. By this means, serial information can be preserved in disk form and retrieved in "full text" mode at the user's request, potentially providing a quantum leap in fulfilling user needs.

Linda Bartley
Serial Record Division

Linda Miller
Automation Planning and Liaison Office

MUSIC: ONLINE AT LAST

In January 1984, the Music Section of the Special Materials Cataloging Division became the first section in Processing Services to input and update bibliographic records online. The impact of automation on music catalogers is not just the story of Music Online, however. To assess the impact which automation has had on the music and sound recordings cataloging programs at the Library of Congress, it is necessary to take a brief look at the operations and responsibilities of the two sections involved and to consider the development of automated processes throughout Processing Services as they relate to all catalogers.

What and How the Music Section Catalogs

The Music Section is unique in both the scope and range of its responsibilities: it is responsible for the descriptive and subject cataloging of printed and manuscript music, i.e., scores, music sound recordings and monographs about music in English (U.S. imprints), Spanish, and Portuguese. It further is responsible for all other monographs about music and for all serials of or about music. The official shelflist for all music materials (classes M, ML, and MT) is housed in the section and is maintained by two music shelflisters, also members of the section.

The majority of work centers in the cataloging of music scores and music sound recordings; some 4,500 such items were cataloged in FY84, while only 600 books about music received complete cataloging in the section in the same period. The cataloging of music and sound recordings is unique in at least two respects--first, no preliminary cataloging is done for these materials, and second, the music cataloger performs both the descriptive and subject cataloging. It is easy to see that the twelve catalogers, two shelflisters, and the section head face a variety of tasks each day and that adaptability to new and changing situations is a prerequisite for success in the job. Over the past seventeen years, developments in automation have drawn music catalogers away from the mainstream of cataloging and have tended to accentuate their need for independence and flexibility.

Why Music Online Took Sixteen Years To Develop

The years between 1968, when MARC records began to be made available, and 1984, when MARC music records finally were made available, were years of enormous change in cataloging generally, as the emphasis shifted from a manual system to one which was automated, a new cataloging code was implemented, and LC cataloging was made even more widely available in machine-readable form. Cataloging policies and directives, naturally enough, reflected these changes, and thus seemed less frequently applicable to music cataloging's old-fashioned, manual procedures. This was not unexpected, given the relatively small place of music cataloging in the overall scheme. On the one hand, at the end of FY84 some 300 catalogers completed 179,168 items; on the other, the seventeen music and audiovisual catalogers had cataloged some 5,000 music scores and sound recordings, or not quite three percent of the total cataloging output.

The MARC program began in 1968 with English-language monographs, additional languages and language groups being added throughout the next decade.

In the mid-70's, there were two further developments which were of moment in the story of automation as it relates to music cataloging: the MARC Music format was published and the MARC Search Service, the Library's first online search capability, was made available.

The MARC Music format--a somewhat inaccurate name, since the format covers music and nonmusic sound recordings as well as printed and manuscript music--had been developed by a group of music librarians working with Lenore Maruyama at LC. LC management said that the format would not be implemented immediately; it was felt that the limited resources available should be devoted to adding languages for book materials and, later, as implementation continued to be postponed, to development of the online books and authorities applications. The music library community, a well-defined and vocal constituency, as well as one which had had some measure of success in earlier lobbying efforts, began pressuring the Library to make music cataloging available in machine-readable form, even before the format was published, and it continued to push the Library until Music Online was implemented.

Getting Closer

The introduction of an online searching capability at LC had little impact on music catalogers or indeed on any catalogers, since the cataloging "universe" was still the card catalog, specifically the Official Catalog. In 1977, when authority records began to be input online, music catalogers were phased into this program with all the other catalogers. Up to this point, then, automation was affecting catalogers pretty much equally; although books catalogers had online access to bibliographic records they created, this access did not affect the catalogers' day-to-day work.

The years 1978-80 were filled with planning for the implementation of AACR2. On the automation front, more languages were added to the MARC universe, with the Cyrillic and South Asian languages added last in their romanized forms, until by 1980 the acronym JACKPHY had been devised to stand for all the remaining languages not in MARC: Japanese, Arabic, Chinese, Korean, Persian, Hebrew, and Yiddish. Materials not yet in MARC were music and manuscripts. The music library community had continued to pressure LC to implement the music format, and LC had continued to cite programs which would benefit a larger constituency as having higher priority.

It was in the planning for AACR2 that a decision was made which, although it did not seem so at the time, was to have the most significant impact on music cataloging resulting from automation up to the time of implementation of Music Online. The decision was made to create, once AACR2 was implemented in 1981, a new official catalog to contain AACR2 bibliographic records, authority records, and references. The further decision was made that for records in machine-readable form, only a main entry and a title card would be filed. This was Processing Services' first step away from the card catalog and toward reliance on the machine catalog, which up to that time had been only supplemental. For materials not in machine-readable form--the JACKPHY languages and music--full card sets would continue to be filed. A reasonable enough idea in theory, but in actuality, it did not work out.

Music Cards Stop Being Printed and Filed

AACR2 was implemented on January 3, 1981; until the summer of 1983--two and one half years--not a single card for music or sound recordings was ever filed in the add-on official catalog, nor, for that matter, in the catalogs of the Performing Arts Reading Room. And, when, at last, cards began to trickle into the catalog, only main entry and title cards were filed. This meant, in effect, that access was only through the main entry for most items. Because of the non-distinctive nature of the titles of many musical compositions--Symphony, Sonata, etc.--relatively few title added entries were made. Other cards were not filed because the Government Printing Office (GPO), for some reason, had stopped overprinting card sets and had a backlog of thousands of them waiting. For JACKPHY language materials, this was not so disastrous, because romanized records input into APIF provided online access to the materials. But, for music materials, there was no access except through the temporary cards filed in the music shelflist and the sound recordings control file, each offering only the single means of access, either the classification number or the manufacturer's label name and number.

In effect, then, the principal impact of automation at this period was that, because of progress in automation, music catalogers had no access to the bibliographic records which they had created. And, although AACR2 records are being retrospectively converted to machine-readable form, there is little hope that all these records will ever be input. The printed catalog, Music, Books on Music, and Sound Recordings will remain as the only comprehensive approach to materials cataloged from 1981-1983. This situation, naturally, could not have been tolerated if it had existed for English-language monographs. But, music catalogers were left to await implementation of Music Online, the development of which was now underway.

Developing Music Online

Music Online did not spring into being overnight. In 1980 talks about the automation of music cataloging began with OCLC, the idea then being that this would be the most cost-effective way to automate music cataloging. Negotiations with OCLC were underway when ASO expressed its willingness to develop a MUMS music application. ASO estimated that a music application could be made operational in six months; they proposed to do this by using much of the existing BOOKSM software. Over the next four years, as requirements were analyzed and written, and programming and testing went forward, all participants in the planning process learned a lot.

It was decided early on, that the time had come to experiment again with online cataloging. An experiment in the beginning days of MARC, in which catalogers tagged their own records, had proved unsuccessful. In the years which had passed, familiarity with MARC records and with computers in general had grown, and this was one factor in the decision. Another lay in the nature of the music cataloging process itself: a small and self-contained group of people carried out the entire range of processing activities for these materials--descriptive and subject cataloging and shelflisting. Many of the questions inherent in true online cataloging, implying as it does additions to a

single record by many hands, would not need to be addressed. The staff was accustomed to work processes which differed from those of the majority of catalogers and it was believed that they were flexible enough to adapt to a new and still different cataloging environment. Further, the catalogers maintained that the coded data fields in the music format required expert music knowledge and thus, could not be properly applied, except by the music catalogers. And, if the coding had to be supplied by the cataloger, why should they not go ahead and key the record online?

During the years when Music Online was under development, the cataloging front was not static. AACR2 had been implemented, and movements toward reliance on the machine catalog continued, culminating in 1983 with the implementation of TOSCA--Total Online Searching for Cataloging Activities. The cataloging universe now shifted from the card and machine catalogs to the machine catalog alone, with the card catalog being relegated to the status of a reference tool. The music catalogers, who stood outside this activity awaiting implementation of Music Online, which had now been "imminent" for a couple of years, found themselves floundering. Directives for cataloging did not apply to them because their work was not in machine-readable form, yet it was expected that music would become so momentarily; it was left to the Music Section to write its own interim TOSCA procedures.

Music Online Goes Online

On March 19, 1984 Music Online was fully operational, and catalogers began to integrate the processes of cataloging, content designation, and online input and update. Catalogers were not only being asked to supply tags for the traditional elements of the bibliographic record; they also were asked to supply codes for the fixed field elements and the coded data fields. In addition to the familiar Geographic Area Code and Language codes, the music format also contains fields for coded music, specific information such as the form of composition and the medium of performance; there are nine additional fields in all. They were asked to perform all these activities at the terminal. A drop in productivity was almost inevitable, and it did indeed drop about 10 percent; just lately it has begun to rise again.

Report Cards and Quality Control

To fully appreciate the magnitude of the task which the music catalogers undertook, it should be noted that music file records, which contain an average of 1,270 characters, are more than twice as long as books records which contain an average 692 characters. Music records contain an average of 23 fields, while books records contain 15. Procedures established for quality control of these records called for their review first within the Music Section and then by the MARC Editorial Division (MARC Ed) to ensure the consistency of content designation across applications. MARC Ed's review was extremely valuable, going beyond a simple review of content designation to alert us to editorial and content designation conventions established over the years and to catch typographical and other editorial errors which were much harder to spot on the screen than on paper. The first "report card" gave us only a 61 percent overall accuracy rate; by January 1985 the Music Section had attained 94 percent and MARC Ed shifted to a 10 percent sampling.

Problems

Because automation met an urgent need, that of access to records, and because it brought music catalogers closer into line with other catalogers both within and outside the Library, there was and continues to be a reluctance to complain about the shortcomings of the system. It is far from ideal, however. Following are some of the more significant of the interesting problems, not all of which are unique to music.

The principal drawback of input and update in the music application is that it was adapted from the books application, developed for use by inputters, not catalogers. The basic design consideration seems to have been based on the concept of a person who would sit at a terminal with a completed catalog record and input this record, adding the content designation. In the music application, the cataloger is expected to create a record "from scratch" online, and this is a completely different concept. This causes problems in several regards. First, there is no prompt screen. The person who creates a record, keys a command and is presented with a list of numbered "boxes", representing the fixed fields. That's it! The remainder of the screen is blank. This is not a problem if one is inputting from a worksheet, but it is an entirely inadequate display for a person cataloging a score or recording which is in hand at the terminal.

Second, the idea that the fixed field values are to be input first, completely misses the mark for a cataloger. The fixed field values can only be supplied reliably when the cataloging is complete; so, for online cataloging, logically, they should be input as the last step, not the first. The current arrangement, which encourages supplying these values at the beginning of the record creation process, means that a value supplied on the basis of the first examination of the item may not be changed, if, in the process of cataloging a different value is found to be appropriate. The particular case in which this has proved troublesome to music catalogers is in dates coding; often, information that an item is a reprint or that a sound recording was recorded earlier is not evident on the first examination. To supply all the fixed field data once the other bibliographic data has been input would lead to greater accuracy.

Third, online input/update policies tend to be "MARC-Ed-centric." In addition to the problem mentioned above with the fixed field input, content designation policies have often been rigidly prescribed for coding on the basis of terminology in the cataloging record. Such rigidity is not always necessary for music catalogers who, with the item in hand, see the total picture rather than the selected information which appears in the cataloging record.

Retrieval Capabilities

Music records are retrievable by all the means currently available in MUMS, and although this goes far beyond the capabilities available to our colleagues who catalog via OCLC and RLIN, there are important points of access for music records which should have been made available and are not. Because of the timing of Books Release 5.2, integrated indexing, and the stage of development of Music Online at the time those requirements were set, no new retrieval capabilities were added; therefore, two of the most important fields in music records are not indexed: publisher and plate

numbers. For sound recordings, the publisher's number provides a unique identifier through the label name and number; for printed music the plate or publisher's number does the same. These numbers will be increasingly useful as the file grows. For instance, a search for one of the 32 Beethoven piano sonatas using the search key "patk bee,son;f=mus," retrieves some 119 records. Not too many records to go through, but then the music file contains only 10,000 records; what will happen as the file grows? As it grows, and the number of records which match such nondistinctive search keys grows, more specific search capabilities will be essential.

Finally, a relatively minor--yet dissonant--point is the traditional disregarding of special characters in machine indexing. Consider the results of searching a large database for a music key when the flat (b) and sharp (#) signs are disregarded: the keys of E and E-flat can only be retrieved together, as though they are the same!

Catalogers remain enthusiastic about Music Online, nonetheless, and consider that its advantages, principally the access to the records, outweigh the disadvantages. An indication of the enthusiasm with which this cataloging program has been adopted is the eagerness with which music catalogers look forward to online cataloging for books and input of authority records. Because most of their work is done online, returning to the cumbersome world of change requests, change records, and the hold file when cataloging books, makes them very appreciative of the relative ease with which records for music and sound recordings can be created and updated. Being pioneers in the concept of online cataloging is exciting, and the amount of interest expressed from those, the majority, who have not yet begun to work with the online system for input and update is gratifying.

Catherine Garland
Special Materials Cataloging

VISUAL MATERIALS ONLINE

The Library of Congress has taken what is probably the most significant step towards achieving a mechanism for bibliographic control of some of its most valuable collections. The Visual Materials Online system brought together staff in three separate divisions--Special Materials Cataloging Division in Processing Services and the Prints and Photographs (P&P) and the Motion Picture, Broadcasting, and Recorded Sound divisions (M/B/RS) in Research Services--to create machine-readable cataloging records for a diverse group of materials.

Daniel Boorstin's view of the Library as a multimedia encyclopedia calls attention to the tremendous non-book resources in the collections. What the multimedia encyclopedia has lacked up to now is a comprehensive, integrated index, the lack of which has hampered access to all forms of material that were not integrated into the general catalogs of the Library of Congress.

A Cooperative Project

Visual Materials Online has been a cooperative endeavor between Processing and Research Services, which have not always seen eye-to-eye on the theory, form, and process of bibliographic control. The idea of an integrated catalog for books and non-book materials has been advanced in library literature and in practice for decades, but the Library of Congress has been fairly slow in extending its automated cataloging operations to all forms of material. The recent publication FIND: Automation at the Library of Congress, the First Twenty-Five Years and Beyond by Peter T. Rohrbach leaves the impression that machine-readable cataloging (MARC) was smoothly applied to non-book material.

In fact, with the exception of serials and maps, MARC programs for non-book materials in the Library's collections have only recently been implemented. The Music Online system was implemented in 1984, eight years after development of the MARC Music format. MARC records for manuscripts (in a format very different from that published in 1973) are currently in development. While MARC records for films have been created since 1972, these records have not been available online and very few of the records are for items in the Library's collections. Visual Materials Online will further bridge the chasm between format development and Library implementation, thus marking a major milestone in building the index to the multimedia encyclopedia.

Audiovisual Section Cataloging Program

The Audiovisual Section in the Special Materials Cataloging Division (Processing Services) operates a cooperative cataloging program which began in 1952 and has been carried out under the Copyright Office and the Descriptive Cataloging Division in the past. This program is aimed at meeting the cataloging needs of libraries that collect audiovisual materials. Cataloging data is supplied by producers and distributors of educational audiovisual materials, including motion pictures, videorecordings, filmstrips, slide sets, and transparency sets. By and large, these materials are not in the collections of the Library of Congress. Audiovisual Section cataloging features AACR2 full-level records which have been in MARC since 1972; with the implementation of Visual Materials Online the records will be available online in the MUMS system. Over 70,000 audiovisual records created under the batch MARC Films system will be loaded to the file, indexed, and will become part of the default MUMS search files.

Audiovisual Section catalogers are experienced in online cataloging in the MUMS environment, since they have been cataloging non-music sound recordings through the Music Online system. Visual Materials Online marks the transition to a complete online cataloging operation in the Audiovisual Section. No major change in the scope or output of Processing Services audiovisual cataloging is planned as a result of Visual Materials Online, but changes may be made gradually in the scope of the cataloging program as libraries begin to collect new and different types of audiovisual material, e.g., videodiscs. A greater degree of cooperation with M/B/RS brought about by Visual Materials Online means that records created for motion pictures and videorecordings in Processing Services' cooperative program will be adapted by M/B/RS when those titles are held by the Library.

In addition to card catalogs and limited machine-readable records, book catalogs with full descriptions and name and subject indexes for some collections have been published (or will be in the near future). These include The Theodore Roosevelt Memorial Association Catalog; The George Kleine Film Collection Catalog; and Television Programs in the Library of Congress: Programs Available for Research as of December 1979. The Roosevelt and Kleine catalogs were produced from MARC records created in M/B/RS in the 1970's. These records will become part of the new Visual Materials Online file. Another M/B/RS automation project, the Nitrate Control System, provides a limited amount of cataloging data in machine-readable form. The Nitrate system contains inventory-level records for films on nitrate stock in Suitland, MD and Dayton, OH. The system is used to track materials through the preservation process and keep track of deterioration of film until it can be transferred to safety stock. Records for most of the nitrate collections have been input.

M/B/RS will use the Visual Materials Online system to create mostly full records for some current and some retrospective acquisitions. Records will contain access points for names of companies and individuals associated with the works and access by LC subject headings. Name headings will be in AACR2 form as established in the Name Authority File. Additional access points for the genre of films will be created, but will not be accessible online until the next major release of the MUMS retrieval system. When a record created by the Audiovisual Section in Processing Services already exists for a title in the collection, this record will be adapted to show that it is held by LC. A project may be set up to find and adapt those of the 70,000+ existing MARC cooperative cataloging records which represent titles in the collections. Some less-than-full records will be included in the file as will preliminary records for materials which have not yet received full cataloging.

P&P's Cataloging Program

The extensive collections (some 12 million items) of the Prints and Photographs Division have been organized, cataloged, and indexed in a variety of ways. Individual items or groups of items (or "lots") related by topical orientation, by provenance, by creator, or by medium are processed according to their documentary or aesthetic value and may be afforded access by physical arrangement of the materials, cataloging by lot, and/or indexing of individual items. A large number of vertical files for direct access to materials; card catalogs for various collections with access by title, proper name, and topical headings; and indices for individual items within collections are available for consultation in the reading room. Word processing equipment has helped to some degree, but the vast collections and high demand desperately need automated control and access. Items which were filmed for the optical disk project will be accessed through a microcomputer catalog connected to the disc player. Prints and Photographs Division plans to use the Visual Materials Online system to create records which will be accessible to researchers throughout the Library, and, with distribution of MARC records, throughout the world.

Records in the online system will be mainly at the collection or sub-unit level, as it would be impossible to create individual records for the millions of graphic items in the collection. Single graphic items which warrant full cataloging will also be cataloged. Abbreviated records will be created as soon as a newly processed collection is available to the public, and the record will be augmented as the collection is cataloged. P&P has plans to input collection-level records for materials which are in the micro-computer/videodisc data base, so that the MUMS files will serve as a pointer to collections accessible on videodisc.

Visual Materials Online System Development

The Music Online system became the impetus and the model for the development of the Visual Materials Online system. Music Online was unique in having catalogers create and input bibliographic records, including full content designation. The Music system was considered one of the most up-to-date MUMS applications (and one of the best documented). The staff of the Audiovisual Section was successfully using the Music system to create records for non-music sound recordings. Many of the same key staff members in the Automated Systems Office, the Automation Planning and Liaison Office in Processing Services, and the Special Materials Cataloging Division, who participated in the development of Music Online have also helped to develop Visual Materials Online. All of these factors contributed to an accelerated system development schedule; when work on the Visual Materials System began in June of 1984, a target date of early 1985 was set for system implementation, and, in fact, it was implemented in November 1985.

Some aspects of the Visual Materials Online system were in fact more complex than the Music system. Music Online started with a clean slate--all records input would be new and would conform to AACR 2. For Visual Materials a strategy needed to be developed for converting the existing MARC Films records (more than 70,000) from the LC internal format to the MUMS format and then loading and indexing these records in the online file. The file conversion had to handle records created under three different eras of cataloging rules and also had to account for numerous changes made to the MARC format since 1972. When the conversion is completed, many MARC data elements will be upgraded. The converted records will be loaded and will be made via the queues developed for the Linked System Project; this technique will pass the records through the edit and validation checks of the Visual Materials Online system and content designation errors will be reported so that they can be corrected online.

Conclusion

The Visual Materials Online system will provide an important tool for non-book cataloging programs at the Library of Congress. The system will not bring about bibliographic control overnight, but will be the important first step toward mainstreaming the cataloging process for archival motion pictures and graphic materials. Although some retrospective cataloging efforts are planned, the online system will, for the foreseeable future, be a supplement to existing manual files in Research Services. The system may be lacking in "bells and whistles," but the truly innovative feature will be its use by three separate processing staffs creating cataloging records for disparate types of materials. New data elements defined for the MARC Visual Materials format will be in place, but it will be some time before these new

elements are accessible online. Even with these shortcomings, Visual Materials Online represents vastly improved access to these invaluable collections of materials which have, up to now, been available only to readers who sought out the specialized reading rooms of the Library. Visual Materials Online may gradually bring about changes in public service by making the multimedia encyclopedia a more tangible reality.

Richard J. Thaxter
Special Materials Cataloging Division

CJK: CHINESE/JAPANESE/KOREAN CATALOGING

For the past fifteen years, computer technology has played an increasingly important role in libraries for the cataloging, inventory, and circulation of books and other materials. Printed materials in languages with roman alphabets were the first to be brought under automated control, as computers and their roman alphabet keyboards were readily available for this purpose. Library systems oriented toward the processing of roman language materials are thus well developed and some even quite sophisticated.

Development

During this relatively rapid development of roman language processing systems, the vernacular languages were left far behind. Technological as well as financial considerations held back their automation, pending a more favorable climate for research and development. It was not until 1979 that the Library of Congress decided that technology was capable of supporting the automated cataloging of vernacular languages. The Library's Orientalia collection had been growing at such a high rate, that the time clearly had come to search for more rapid input and access of bibliographic records. This conclusion also had been reached by the joint advisory committee of the East Asian Library Program, a group composed of representatives of the Social Science Research Council, the Association of Research Libraries and the American Council of Learned Societies. In the fall of 1979, the Library entered into an agreement with the Research Libraries Group (RLG) to develop an automated system for Chinese, Japanese and Korean vernacular language cataloging. By this agreement the Library would cooperate with RLG in system development, and once the development was completed would use the system (hereafter called the RLG/CJK system) on a trial basis.

The New System

Four years later, RLG unveiled a completed system ready for a trial run. Manufactured by Transtech of Massachusetts, the CJK terminal is a modified version of the SINOTERM, a Chinese word processor, marketed chiefly on Taiwan. It consists of a CRT display and a keyboard with 179 keys, of which 133 are character keys, 36 are function keys, and ten are control keys. The character keys contain parts of Chinese (and Japanese) characters, the Japanese syllabic systems (Katakana and hiragana) symbols, as well as the symbols for the Korean Hangul system. Chinese characters and Korean Hangul are created by combining components from different keys in a specified order at the bottom line of the screen, called the "scratch pad." Once the desired sequence of components is entered there, pressing the space bar will cause them to be combined into one character and moved to the cursor location on the screen proper. Improper component sequences are signaled by a beeping sound and positioning of the scratch pad cursor on the inappropriate component. The central portion of the keyboard also contains a mostly standard roman letter/arabic numeral arrangement. The character sets can be selected by pressing the appropriate character selection key: Chinese (Han tzu), Japanese (Kana), Korean (Hangul), or roman. Characters from these sets can be mixed together as needed, simply by switching from one set to the other.

The CJK terminals are usually clustered together in groups of four, with the clusters being connected to a controller, which is in turn linked to RLIN's main computer via a telephone line. The controllers contain a local dictionary of the Chinese/Japanese/Korean character sets, which can be expanded to accommodate additional characters. Each cluster also includes a dot matrix printer, which can print each of the three character sets plus roman. The print resolution for CJK is quite high, and each character is surprisingly distinct. This is true even for those characters which consist of a large number of components.

CJK monographic cataloging is input into the RLIN data base via these terminals. Cataloging workscreens consist of a standard RLIN input (catalog/create) screen, plus a code indicating the presence of vernacular fields and the vernacular fields themselves, which are parallel to the romanized fields.

Syllable Aggregation System

Due to certain storage and searching limitations imposed on the Research Libraries Information Network (RLIN) system by word length, it was necessary to devise a so-called "syllable aggregation system" for Chinese. Of the CJK languages, Chinese was the only one which did not yet have such a scheme, since that language has traditionally -- though erroneously --been viewed as possessing a monosyllabic word structure. This view was supported by the fact that Chinese characters represent sounds of only one syllable and do not connect with one another. Therefore, they appear to be individual words. Until fairly recently, virtually all romanized renderings of Chinese characters have been syllable-by-syllable. The syllable aggregation system constitutes a recognition of the polysyllabic nature of Chinese and represents a highly specialized attempt to provide a systematic method for combining syllables based not only on semantic grounds, but also on RLIN system requirements. Since the RLIN system does not recognize two-letter words in a string, aggregation, for the most part, has solved this by creating longer search key units.

Staff Training

The first CJK terminals were delivered to LC in the spring of 1983. Training in the use of these terminals was provided for a small group of volunteers from the Preliminary Cataloging and Chinese-Korean Cataloging Sections in the Descriptive Cataloging Division, the Preparatory and Japanese Cataloging Sections in the Shared Cataloging Division, Subject Cataloging (Asian Section), and Decimal Classification. After being trained, these catalogers participated in a pilot project to determine the best workflow configuration for processing CJK materials, that is, what portion of a record would be completed by Preliminary/Preparatory Cataloging and what portion would be completed by Chinese-Korean/Japanese descriptive cataloging.

Four plans were devised to make this determination. Each of these altered the amount of work to be done by the sections. Materials followed a normal path through processing: Preliminary (or Preparatory) Cataloging--Chinese-Korean, or Japanese Descriptive Cataloging--Subject Cataloging (Asian Section)--Decimal Classification--Shelflisting. The project was carried out from October 1, 1983 to November 6, 1984. Data gathering continued while LC awaited the arrival of additional terminals and training materials, and concluded a satisfactory implementation agreement with the Professional Guild of the Library.

Analysis of the data indicated that the workflow scenario showing the greatest processing velocity was the one in which the Preliminary and Preparatory Cataloging sections supplied some of the fixed fields and roman/vernacular fields up to and including the 4xx (series) field. The cataloging record would then be completed by Descriptive, Subject, and Decimal Classification.

Training and phase-in of all CJK catalogers commenced in November 1984. The training consisted of classroom instruction in MARC (RLIN) tagging and practice in character creation and cataloging on CJK terminals. Since each cataloger did not have a terminal, scheduling was necessary. This did not impede the learning process, however, since the training and phase-in periods were so long that everyone had sufficient hands-on experience by the time they resumed cataloging operations in June 1985. The necessity for scheduling remains, however, and will continue indefinitely.

Catalogers in Descriptive, Shared, Subject and Decimal Classification found the CJK system easy to use after the training period, and efficient scheduling of terminal use has allowed them enough time for online cataloging activities.

Frustration is felt, however, over system interruptions resulting in loss of work in progress. Interruptions are reported in a "down-time log." An examination of the data gathered from these logs during the period covering the first three months of the phase-in period, showed that the effect of down-time and other interruptions on productivity is marginal. It is anticipated that further improvements in hardware and telecommunications will lead to greater overall system reliability, which in turn will result in some increase in productivity and alleviate the frustration felt by catalogers when the system is not operational.

Workflow

During the phase-in period, it became apparent that cataloging in Descriptive and Shared was being performed at a more rapid pace than before implementation of the CJK system, because Preliminary/Preparatory Catalogers are responsible for major portions of both the romanized and vernacular fields in the records. This accounts for the slowdown in those sections and the corresponding speed-up in Shared/Descriptive. In addition, RLIN system interruptions can result in record loss at the preliminary cataloging stage, since those catalogers are starting from scratch, rather than building on a record which already has been stored in the system. Descriptive catalogers at worst will lose a few fields if the system is interrupted, since they work primarily on records that are already part of the data base. The net effect of this distribution of work is a decrease of materials going to Descriptive Cataloging. It is believed that the two additional terminals which have been provided for the use of Preliminary and Preparatory catalogers will allow them to keep up with the demands placed on them by this change in workflow.

To date, approximately 14,000 CJK records have been input into the RLIN system by LC catalogers. This represents a major contribution to a data base, which also is being augmented by the 20 other CJK participating institutions. Records can be retrieved either by vernacular or romanized search keys. CJK records thus can be separated from non-CJK records by performing vernacular or aggregated syllable searches.

Another benefit to those retrieving data from the CJK system is the ease of identifying and understanding information presented in a vernacular form. This will prove to be a major factor in the resolution of name authority conflicts. Furthermore, in a language having few syllable types, such as Chinese, words appearing in aggregated form are more easily understood, once again allowing for ready identification of titles and other data present in romanized cataloging records.

The Future

The RLG/CJK system has already proven itself to be an efficient means for input and retrieval of vernacular language bibliographic records, and as such represents a significant advance in library automation. Now that this system has gained general acceptance and is being used by an increasing number of libraries, another system designed to perform the same activities has appeared on the horizon: the OCLC CJK system. It is based on a different approach to input and access, the exclusive use of romanization, plus, in the case of Chinese, tone numbers following syllables. As the OCLC system is scheduled for testing late in 1985, it is not possible yet to assess its performance or compatibility with the RLG system. In light of the imminence of the Linked Systems Project, one can only hope that the two CJK systems will eventually follow the same path as the roman language bibliographic data bases which have preceded them.

Fred Protopappas
Descriptive Cataloging Division

COPICS: A MILESTONE IN LIBRARY AUTOMATION

The Copyright Office is no stranger to computer technology. As early as July 1962, two years before Gilbert W. King's report Automation and the Library of Congress (1964), the Library's Computer Task Force Committee decided to explore possibilities for using computer and electronic processing in connection with copyright functions. And, in 1965, the Copyright Office faced the challenge of indexing the public hearings on the Copyright Revision Bill (House Resolutions 4347, 5680, and 6835; 89th Congress, 1st Session). Using a small IBM 1401 computer, it prepared a subject/name index to 1,930 pages of printed text.

That minor achievement is significant because it places the Copyright Office among the Library's front-runners in using computer technology for practical applications. But nearly ten years later, Copyright reached a historical milestone, not only within its own office, but within the Library of Congress. In September 1974, the Copyright Office installed an automated, on-line system for cataloging copyright registrations. Known by the acronym COPICS, (Copyright Office Publication and Interactive Cataloging System), it has the distinction of being the Library's first major on-line cataloging system.

COPICS: 1974-1977

The 1974 implementation of COPICS represented a huge step forward in the work-processing methods of the Copyright Office. Its interactive entry and update capabilities allowed the office to provide accurate, efficient, and controlled data for copyright registrations. From the beginning, the automated system had three primary goals:

1. Preparation and editing of catalog entries covering all copyright registrations.
2. Duplication and sorting of all catalog cards.
3. Production of camera-ready copy for the Catalog of Copyright Entries (CCE).

The entry portion of the automated system used a CRT formatted display to prompt catalogers, revisers, and reviewers to make corrections and up-dates on-line. Sixty terminals, connected by telephone line to the Library's central computer site, were installed in the Copyright Office, located then at the Crystal Mall Annex in Arlington, Virginia.

COPICS began with copyright registrations for sound recordings. In 1975, it provided camera-ready copy for the Catalog of Copyright Entries, Part 13: Sound Recordings, covering registrations from February to December 1972. It was gradually phased into Cataloging's three divisions, Arts, Music, and Books. Periodical registrations were added to the system in 1976. And, in the same year, plans were undertaken to retrieve copyright bibliographic entries using the Library's SCORPIO system.

During the early years of COPICS, the basic problems encountered by any new automation venture were resolved, and the system brought under bibliographic control the creative and intellectual works submitted for copyright registration. COPICS was the largest on-line cataloging system in the world.

Copyright's on-line cataloging success is directly related to the flexibility of its software program and of the automation specialists who developed the application. At no time did that adaptability manifest itself more substantially, perhaps, than during the year 1977. COPICS was then revised to meet the new requirements of the Copyright Law of 1976 (Public Law 94-553). The expanded and updated system, called COPICS II to distinguish it from its progenitor, allowed not only for new classes of copyright registrations, but also for new data elements and for on-line retrieval. Coinciding with the effective date of the new copyright law, it became operational on January 1, 1978.

COPICS: 1978-1985

Scope and Input Sources. The most obvious enhancement of COPICS as revised to meet the requirements of the Copyright Law of 1976, is the on-line capability to control bibliographically all published and unpublished works registered for United States copyright protection. Eight classes of registrations became effective in 1978:

* Nondramatic Literary Works (Class TX, excluding serials and periodicals)
* Serials and Periodicals (Class TX)
* Performing Arts (Class PA, excluding motion pictures and filmstrips, but including musical works, dramatic works, pantomimes, and choreographic works)
* Motion Pictures and Filmstrips (Class PA)
* Visual Arts (Class VA, excluding cartographic materials but including all other pictorial, graphic, and sculptural works)
* Maps (Class VA)
* Sound Recordings (Class SR)
* Renewals (Class RE)

In the fall of 1984, a new category of registrations was added for Mask Works (Class MW, computer chips). Prior to that expansion, COPICS had been updated to allow for the on-line cataloging of copyright documents. These legal records include transfers of copyrights, termination notices, identification of anonymous and pseudonymous authors, statements indicating the living or deceased status of an author, and statements identifying that a copyright notice name is in error.

The present COPICS system allows for complete on-line cataloging and editing. Each entry consists of two parts: bibliographic data and copyright (legal facts) data. Bibliographic data are taken from the deposit copies that accompany each registration. To the extent available and applicable, each entry for monographic registrations (all classes except serials) includes the following bibliographic information: title, statement of authorship, edition statement, imprint, physical description, series statement, cast credits, in-analytical statement, International Standard Book Number, notes, and contents titles. Cross references are included also. Monographic registrations, again to the degree applicable and available, include essential copyright legal facts: limitations on the claim, claimant name, in-notice name, application title and author, information concerning previous registration, new matter appearing in the copy being registered, date of creation, date of publication, in-notice date, date of registration, and miscellaneous registration information.

Data fields for serial registrations may include: title, edition information, frequency, parallel titles, subtitles, statement of responsibility, imprint, series statement, notes, International Standard Serials Number, copyright facts, last claimant name, last volume, and holdings.

For documents, the data fields include: information identifying the type of document, full document range, date of recordation, date of execution, assignor, assignee, first title and information regarding the document as a whole, individual titles within the document, and cross reference.

Holdings and Storage Media. The current machine readable COPICS database covers all registrations and documents received since January 1, 1978. It includes a monograph file of about 2.5 million registration records, a serial file of approximately 51,000 titles representing approximately 700,000 registration records, and a document file of approximately 500,000 records.

On-Line Products and Services. In addition to its on-line cataloging capabilities, COPICS generates three types of on-line products and services. First, it provides and sorts computer-produced catalog cards for title, author, and claimant index terms. Miscellaneous index terms may be created for imprint data appearing in maps and sound recordings. Until January 1982, these cards were used internally to maintain accurate manual records in the Copyright Card Catalog. At that time, however, it was decided to close the card catalog, except for serial registrations, and to rely solely on the COPICS-based retrieval system. Sets of catalog cards continue to be produced, nonetheless, for internal use elsewhere in the Library of Congress: Geography and Map Division; Motion Picture, Broadcasting and Recorded Sound Division; and the Music Division. They are also distributed to outside subscribers through the Library's Cataloging Distribution Service.

Second, COPICS generates camera-ready copy for the Catalog of Copyright Entries (CCE), issued according to individual classes of copyright registrations. Entries in the CCE appear in International Standard Book Description format, and each catalog is divided into two parts. The first part is arranged alphabetically by title; the second, alphabetically by author/claimant name. All parts of the CCE are published semiannually except Nondramatic Literary Works and Performing Arts, which are published quarterly. Since 1979, the CCE, which has been published only in microfiche, has been available from the Superintendent of Documents, U.S. Government Printing Office.

The third on-line product created by COPICS is the automated bibliographic retrieval system. Both the Copyright Office History Monograph (COHM) file and the Copyright Office History Document (COHD) file are SCORPIO subsystems, accessible on-line through the Library of Congress Information System (LOCIS). The COHM file contains 4.1 million index terms; COHD has 546,851 index terms. Both retrieval systems are updated weekly. Plans are under way for automated retrieval of copyright registrations for serials and periodicals.

COPICS: 1985 and Beyond

If the basic premise of automation in a library is to speed and improve the functions of acquiring information, recording it bibliographically, and making it available to users, the COPICS system has scored a decided success. And it has done so with greater effectiveness and improved productivity. For example, in 1978 when the system became operational under the new copyright law, the ninety member Copyright Office Cataloging Division staff cataloged 365,000 registrations on-line. Since that time, copyright registrations have shown a twenty-two percent increase, totaling an estimated 520,000 registrations in fiscal year 1985. Yet staffing in the Cataloging Division for 1985 remains at the level of ninety individuals. That the same number of staff have been able to provide continued bibliographic and legal access for an ever-increasing number of registrations underscores the effectiveness of on-line cataloging in the Copyright Office.

It would seem unlikely that on-line productivity in the Cataloging Division can continue to increase at the same rate in years to come. The Copyright Office, however, remains strong in its commitment to offer improved services through COPICS. Until March 1984 the COHM and COHD history retrieval files were available only within the Copyright Office. Since that time both files have been accessible from any terminal communicating with the Library's mainframe computer. The development of a serial registration retrieval system will complete the process of allowing on-line access to all copyright records. The next logical and inevitable step--one that may precede the serial retrieval system--will be the distribution of computer tapes for all copyright registrations and documents.

The Copyright Office continues to make advances in on-line technology. In the fall of 1985, it offered its entire Cataloging Division staff an ergonomic skills training program designed to make the task of on-line work easier and still more efficient than before. Shortly thereafter the same training was given to all Copyright employees involved in automation. Developed by the Joyce Institute, the Dataspan program is designed to improve health and comfort and to improve productivity by making optimum use of technology.

Copyright's application of ergonomic skills training within an on-line cataloging environment is another first with the Library of Congress. It is a second milestone in automation for COPICS.

Brent L. Kendrick
Copyright Office

AUTOMATED COLLECTIONS CONTROL

The Library of Congress collections are an incredible treasure trove. Their value, however, is in direct proportion to their accessibility, both bibliographic and physical. Over the past twenty years the Library has made significant strides toward the application of automation to the need for bibliographic accessibility. Future years will see those strides matched by similar progress in the application of automation to the need for physical accessibility to the collections. This is not to say that nothing has been done yet; much of what has taken place in the bibliographic automation arena has helped lay the groundwork for automated physical collection control. Moreover, automated applications addressing some aspects of physical collection control have been developed, the Book Paging, batch Government Loan and Automated Book Conveyor systems being cases in point. The coming years will see efforts to develop not only additional applications in support of physical collection control, but also to coordinate and integrate them into a coherent whole.

All this sounds terrific, but what does it actually mean? Basically, that through the use of automation, the Library of Congress in time will be able to more fully answer the primary questions that confront both those who use and those who maintain library collections: Do we have a given item? Is it available for use? How quickly may I see it? And if it is not available, why not?

Size of the Collections

While these questions may seem mundane, answering them within the context of one of the world's largest archival collections is no mean feat. Collections Management and the Loan divisions, as well as many special divisions throughout the Library work valiantly to answer them. However, the enormous and ever growing size of the collections, at last count well over eighty million items, coupled with cuts in funding and personnel, makes the task increasingly difficult to perform manually. Automation will help ease the task.

Ironically, the systems being developed to provide physical collection control may be obviated in time by the use of technology such as optical disk storage. Given the magnitude of the LC collections, it will be literally years, possibly decades, before conversion to such technology could remove the need for physical collection control. The Library cannot simply wait to be overtaken by the course of events, if only because the time involved may be so great. Moreover, there are portions of the LC collections which may never be considered appropriate candidates for other than physical storage and control.

Caveats

While automation will greatly aid in the physical control of the Library of Congress collections, several caveats must be noted. First, the magnitude of the collections will affect the development and use of automated physical collection control applications to some extent in the same way that it will affect the use of alternative technologies such as optical disk storage and retrieval. Although the Library's various machine-readable bibliographic files will provide a head start in the capture of copy specific information in machine-readable form, additional data still must be input.

Also, the machine-readable item identifiers (commonly referred to as Piece Identification Numbers, or PINs) must be affixed to the individual collection items so that they can be accurately identified with a minimum of data entry as they move about the Library. The logistics of affixing PIN labels and accurately linking them to the appropriate machine-readable bibliographic and physical inventory information is no small task in terms of time, effort or money. It must be remembered, however, that no one ever said that the development of automated collection control tools would be either easy or inexpensive. Rather, the issue is one of trade-offs, since the price to be paid for not having such tools appears to be even higher.

Many of the automation projects currently planned or under development, for example, the automated circulation control and the serial check-in systems, will move the Library toward the goal of physical inventory control. However, they must be able to communicate with existing systems such as LOCIS, for bibliographic searching, and the Book Paging System, for actual retrieval of material from collection storage. Differences between such systems as to purpose, data structure, and programming language eccentricities must be reconciled or at least accommodated. Moreover, the Library must be willing to address the procedural and policy issues that may arise during the process of reconciling technical differences. Such issues might include the arrangement of material in collection storage (classified vs. accession number order), the appropriateness of reader access to stack areas, and the responsibilities of custodial divisions in the reporting of holdings and location activities related to material in their collections.

Realism

If efforts to develop effective tools for automated LC collection control are to be successful, one final point must be kept in mind. All the parties involved, end users and system developers alike, must be realistic in their expectations, not only of the activities to be supported by developed applications, but also of their own role in the development process. User organizations must be willing to make staff available for the stating of system requirements and the review of development results. Moreover, they must be ready to act as their own advocates when it comes to the allocation of automation resources, both within their own departments and when dealing with automation suppliers. Further, they must understand that the needs of the Library as a whole may not always coincide with perceived division or department needs. This is not to say that the suppliers of automation services are "off the hook." In fact, organizations such as ASO must continue to strive for greater understanding of the needs and pressures that confront their users, as well as to make a concerted effort to develop needed automation tools in a timely manner. However, both parties must be aware that development of automated systems, particularly the kind of integrated system that will be needed to provide meaningful LC collection control, is a matter of shared responsibility.

Virginia Vitucci
Automated Systems Office

AUTOMATED BOOK PAGING

The objective of the automated Book Paging System (BPS) is to provide a timely and reliable method by which staff members in the three Library buildings on Capitol Hill and at the Landover Center Annex may request that books in the Library's collections be sent to them for their work. Requests are entered on LC terminals and are are routed automatically to the collection storage areas, i.e. the book stacks, and messages related to the status of the requests and the books themselves are sent to the requestor. There are three types of BPS users: those who request books, collection attendants who locate and retrieve books, and Circulation Section employees who check the Loan Division's records when a requested item is not on the shelf.

In the stacks, requests are printed out and the item is searched by a collection attendant. If the item is located, the user receives a message stating that the book has been located and is in transit via the Automated Book Conveyor System. When the item is not on the shelf, a message is sent automatically to the Circulation Section of the Loan Division, where the Central Charge File is checked for a record of the book. The response from the Loan Division is returned to the requestor via BPS.

BPS' Development

BPS has been in production and simultaneous use since 1980. Since the initial version of book paging was designed as an alternative to the pneumatic tube message system, the development of it has been incremental rather than in broad strokes. Several more enhancements that are planned for the present system, most of which are designed to reduce the amount of manual effort required to transmit a request to the stacks.

The next incarnation will be known via the FETCH command. In this release, users will not be aware of a separate Book Paging System. Once a user, through SCORPIO or MUMS, has identified the items to be requested, a function key will be pressed to automatically generate paging requests. Presently, users need to search SCORPIO or MUMS to locate the correct bibliographic citations, sign off, sign on to BPS and re-key the request information. With FETCH, the paging function will be simply another feature of the bibliographic systems.

Connections

Book paging has a strong relationship with the Circulation Control Facility and the Automated Book Conveyor System. Since BPS is used to request the delivery of items in the collections, a completed book paging request results in a change of location for the physical item. Clearly, there is a need to communicate this information to the soon-to-be-completed Circulation Control Facility (Loan Division), which will control the assignment, charging, and discharging of items in the general collections, as well as to the Automated Book Conveyor System (ABCS). These delivery and control systems will be under the umbrella of a master tracking facility, the Collection Control Center, which ultimately will monitor the status of every item in the collections.

The functional elements of collection control--requesting delivery and physical transportation--are related so closely that many users do not realize that the Book Paging and Automated Book Conveyor systems are not the same facility. In fact, BPS and ABCS run on separate computers that presently do not communicate, although the planners of circulation and control want to develop links between them.

Features

The system has three features to ensure that a request will not get lost. The first causes unanswered requests to be printed out repeatedly in the stacks. The collection attendant must send a response to the requestor stating that the item has been sent or that the request cannot be satisfied for specified reasons, and the response must be sent in an amount of time allocated by the Collections Management Division or the original request will be regenerated every few minutes like the baby Bacchus.

The second feature alerts Collections Management to equipment problems. In the case of a printer breakdown, a message is printed at the Collections Management Control Center, ensuring that requests will not be lost due to an inoperative printer. If a BPS printer in any of the offices fails because of loss of power or because the printer is out of paper, an error message prints in the Collections Control Center of Collections Management. The printer that receives the message is called the Master Printer, and if it fails, the message will be printed on the Grand Master printer, which also is located in the Collections Control Center. Once a requestor sends for a book via Book Paging, the system controls the routing of the messages related to the request. In addition to error messages, the system also monitors the status of the printers.

Finally, there is a chance that the error message from a printer or terminal may not be received by the system because of hardware or communications problems. In this event another monitoring function, called the Print Monitor, is used to discover and report problems. It is triggered by the amount of time taken by a printer to report that it has received a message. Presently, the Print Monitor is not ready for use.

Using BPS

BPS users enter requests for Library items on terminals at workstations. The workstation is linked to the book conveyor station to which the requested items will be sent. Each workstation is given an ID which is the same as that of the Automated Book Conveyor System delivery point. Since the workstations in Book Paging and ABCS have the same ID numbers, the user only needs to use one ID code for requesting books. The relationship between the systems is reinforced by the use of the workstation ID. A BPS user in the Madison Building may enter "A20" as the destination for all of his/her requested materials. "A20", refers to a book conveyor station, where the books are sent.

Except for an initial security sign-on screen, BPS users use a single display for entering requests--the call number request display. The request screen requires an identification number for the transmitter, a call number for each item requested, and a destination for the requested book. The SEND TO destination code and classification number are also checked by the computer for validity, but the Cutter

number is not presently checked. If the BPS user makes an error in entering any of the required fields, the system will highlight the offending fields of the call number request display. The user can resubmit the request by correcting the highlighted entries.

What BPS Retrieves

The most frequent errors detected on the call number request display are those in which the classification number is not valid because the user is attempting to request items that are not in the general collections or the classification number is incorrect. The Collections Management Division, which administers the Book Paging System, services requests for items in the general collections only, and not law, geography, or music. Also, one cannot request rare books, current periodicals, microforms, and film. (The precise definition of the collections controlled by the Collections Management Division is given in Library of Congress Regulation 214.9 section 2. 3.) There are some non-classified collections serviced by CMD that can be requested through book paging, including: Priority 4, "X" collection, Minimum Level Cataloging, City, Telephone or Social Directories, and materials stored at the Landover Center Annex.

Once a request has been entered by the BPS user, it is transmitted instantly to the appropriate stack location where the item is printed out and searched by the collection attendant. The attendant takes the printed request to the stacks and retrieves the material or notes a response on the request slip. The attendant then enters a reply, using the Collection Attendant Search Reply display, a part of the STAK function. Every request must be entered on the Search Reply display, including the transaction number of the request, the collection attendant ID, and the number of pieces sent. There is an optional free text field which the collection attendant may use to send an expanded message. The attendant uses function keys to send the most frequently-used replys. By pressing a single function key, the attendant sends a message stating:

FOUND: The requested item has been located and is in transit.
NOS:The item is not on the shelf--Loan records being checked.
VOL: Specific volume information needed to locate item.
CALL: Call number appears to be inaccurate.

The most frequently used keys are FOUND and NOS. FOUND transactions print at the requestor's printer and terminate; NOS transactions print in the Loan Division, where they are searched in the loan charge records.

The Circulation Section staff in the Loan Division use the LNOS function of Book Paging to respond to a NOS request. Their Loan Operator display is similar to the STAK display, in that it requires transaction and Loan Operator ID numbers, and it accepts function keys for frequently-used replies. The response from the Loan Division is sent to the requestor via the requestor's printer.

The system administrators in the Collections Control Center have access to special functions of Book Paging. Certain Control Center staff are designated as "key operators" for Book Paging and can adjust system operating parameters, such as the amount of time allocated for the collection attendant to respond before a request is reprinted. The Key Operator adds new users, terminals, printers and workstations. As the collections are shifted, the key operator changes the association of call numbers and stack locations.

The Control Center also collects a variety of statistics on the use of Book Paging. BPS users in CMD and in the Law Library wrote their own Statistical Analysis System (SAS), which reads the various types of BPS data and produces reports that provide complete descriptive statistics. Each participating organizational unit has designated key trainers, who will instruct new users. As new units join Book Paging, the Collections Management Division will provide documentation and training for the key trainer of the new unit.

Maurice Sanders
Office of the Assistant Librarian for Research Services

THE AUTOMATED CHARGE FILE

The Library of Congress' Loan Division, like most libraries, checks out material by creating a charge record each time a book circulates. But, unlike most libraries, LC has seventeen patron groups to which we circulate approximately 150,000 items annually, as well as numerous inside charges not included in this count. Since it is not unusual for some of our larger, more active patron groups, e.g., government agencies, to have over 500 items checked out at once, needless to say, we have been interested in automating our circulation operations.

History

The Loan Division's history is filled with valiant efforts to automate circulation operations. In the 1960's all circulation to government libraries was transferred to an IBM key punch machine. Cards were punched at the point of check out and processed overnight in batch mode. The next day, we received a print out of current charges. We still, however, were recreating a charge record each time an item circulated and this system could not accommodate all patron categories.

In the 1970's the Division worked with the Automated Systems Office (ASO) to develop an in-house system to accommodate all of our patron groups. The system was dubbed LACS (an omen) and stood for Loan Automated Circulation System; it was lacking indeed and was aborted before it ever became operational

New studies were undertaken to see what systems were available commercially and if our needs could be accommodated by them. Nothing existed that was capable of handing the vastness of the Library's collections, our varied users and the numerous and complicated policies and practices governing circulation operations. Thus, with ASO, the Loan Division set out to develop the ultimate in-house automated circulation system. In the meantime, so that management and staff could have exposure to some kind of an automated circulation system to better formulate their requirements, OCLC's Local Systems or LS/2000 (formerly Avatar's Integrated Library System or ILS) was acquired.

In-House System Chosen

The in-house system, which is being developed now has several advantages over LS/2000 as it is being custom designed to fit the intricate needs of our operations. It will accommodate our seventeen patron categories: Congressional Member, Congressional staff, cultural institution, diplomatic, exhibits, Federal agencies, former LC staff, former Member of Congress, interlibrary Loan, LC staff and work units, media, statutory officials, study facilities users, temporary, and writers; and system parameters will be set to monitor the specific guidelines or limitations associated with each category.

The new circulation system, called the Circulation Control Facility will collect all information necessary for our circulation operation, including account name and category, address, telephone number, and for some accounts, name of authorized representatives. Terminal operators will have the ability to create, edit and delete patron information online. The system also will monitor the loan starting and expiration dates, restrictions, overdues, recalls, holds, method of dispatch, and loan period and limit.

With LS/2000, we have had to re-catalog each item to create our circulation database. With the in-house system, if the item has a Library of Congress card number, we will retrieve the MARC record and transfer the necessary bibliographic elements from it to a pre-formatted input screen and trigger creation of a machine-readable copy specific bibliographic record in the circulation database. If the LC card number search is unsuccessful, the terminal operator will generate at least a minimal level citation. Once the loan charge record has been created, the system will generate a book pass which will serve as proof that the item has been properly charged and allow the item to be taken off Library of Congress premises.

Discharging loan transactions will be supported online. At return, the data link between the patron and item will be dissolved, and the item will be available immediately for subsequent loan. The system also will notify the terminal operator of any outstanding hold requests for an item at discharge and when appropriate, print a return receipt for each discharge.

Because most patrons check-out and return more than one item at a time, the system will provide for the "stacking" of charge and discharge transactions. The terminal operator also may initiate recalls and renewals by changing the status of an item on loan. The change to overdue status will be automatically accomplished by the Circulation Control Facility. Overdue notices, recall notices and lost notices will be generated overnight or on a pre-determined schedule.

Most of these functions will be used in the Loan Division's Circulation Section. The system, however, is being designed to accommodate not only circulation operations, but also to automate some of the manual operations in the Interlibrary Loan and Congressional Loan Sections. Finally, system access security will be on two levels, terminal and password authorization.

All major features are scheduled for the first release of the system software. Subsequent releases (on no set time table) will include an interface with the Library of Congress Book Paging System (BPS), which would check circulation records before attempting to page a book from the stacks; an interface with the Library of Congress Information System (LOCIS), which would allow readers to search for items in the computerized catalog, check circulation records and page a book in one action; an interface with the On-line Technical Processing System (TPS) which would provide information about items on order or being cataloged by the Processing Services Department; interface with the Library of Congress Administrative/Personnel Information System which would establish patron authority by allowing access to the latest listing of LC staff and their addresses; and, an interface with the Copyright Office Publication and Interactive Cataloging System (COPICS), which will provide information on material being cataloged in the Copyright Office.

The date of the first release has been rescheduled many times--will the current date of spring, 1986 hold? We hope so!

Cassandra R. Allen
Loan Division

TRAVELIN' BOOKS

Installed in the late 1970's, the Automated Book Conveyor System (ABCS) transports books and other Library materials between 53 stations in the Jefferson, Adams, and Madison buildings. The conceptual design and planning for this system took more than a decade and was related integrally to the planning and design of the James Madison Memorial Building.

Prior to the opening of the Madison, a pneumatic tube system was used to transport books between the Jefferson and Adams buildings. This high-speed system connected the Main Control Room on the ground floor of the Jefferson Building with the Adams Building control room on Deck 12 and transported material between the two points in about 35 seconds. While having the distinct advantages of speed and dependability (the system rarely broke down, and since there were only two openings, misrouting was impossible), the system had

two distinct disadvantages: high speed, coupled with rapid acceleration and deceleration presented serious preservation problems by damaging bindings and further deteriorating already brittle material, and the system was limited in its use to transporting material between two buildings. To address the requirements both for preservation and for linking all three buildings, the present automated book conveyor was designed and installed.

ABCS incorporates five main vertical conveyor units, one in each color-coded quadrant of the Madison Building with an opening on each floor and a fifth unit in the Adams Building with openings on each deck level (1-12) and one in the Science Reading Room. In addition, there are other isolated stations, several in the Madison Building and one in the Main Control Room of the Jefferson Building (the only station located there).

Operation

The employee places the books in the box, inserts the box into the opening at the conveyor station, and inputs the station number of the final destination. The box then moves through the system to its destination. Each box has a computer-readable code plate on the side, making each one unique and capable of being tracked and routed through the system.

The automated control for ABCS is provided by dual Dec PDP 11/34 computers, each with a capacity of 80k words of core memory. The computer functions as overall system controller and activity monitor. Although the Automated Book Conveyor System actually is operated by the Architect of the Capitol, a video display terminal and a printer have been installed in the Collections Control Center (Jefferson Building), which provide full-time monitoring of ABCS and the Automated Book Paging System. The key operators in the Collections Control Center use the terminal and printer to monitor the status of the system, performing such operations as locating boxes within the system, noting that a box is full, that a station has exceeded its limit on the number of boxes programmed for it, and seeing when a part of the system (a conveyor, a code reader, etc.) is out-of-service. In consultation with the engineers in the Office of the Architect of the Capitol, the key operators in the Collections Control Center use their terminal to put these devices back into service. In addition, the Center serves as the primary contact for users of the Automated Book Conveyor System and as a liaison with the Architect of the Capitol.

Now, with all this sophistication you might want to know how long it takes now for a book to reach its destination: twelve minutes from Adams to the Jefferson and 24 minutes from Adams to the Information Office in the Madison Building, green core. But...it arrives safely.

Steven J. Herman
Diane Nester
Anthony Padua
Collections Management Division

LOCIS AND THE ENCYCLOPEDIA PLAN

The encyclopedia plan aims to create specialized reading rooms, e.g., Social Sciences, Humanities, Performing Arts, and to tie the areas together with a strong central index (the Main Reading Room) to counterbalance the centrifugal tendencies. The index is crucial to the success of the overall plan.

I propose that the success of the central index depends on: cleaning up the PreMARC database, saving the frozen pre-'81 card catalog until such time as the PreMARC database functions well, getting more bibliographies into the Main Reading Rooma (a topic I will not discuss here), and making it easy for people to perceive LOCIS within a larger context of several other equally important avenues of access.

In pursuing these goals there are two basic tenets of library science that need to be kept in mind. The first is the principle of uniform heading which holds that a cataloging system should group together under one subject heading the variety of works whose titles may express a particular idea in many different phrasings and synonyms and whose filing is otherwise scattered throughout the alphabet (1) ; and that the same uniform heading, with appropriate subdivisions, e.g., "--History," "--Bibliography," should group together in one place the many different aspects of a subject, e.g., historical, social, legal, educational, fictional, technical, or bibliographical, whose coverage is scattered throughout the classification scheme. Further, there should be multiple cross-references so that users can find the appropriate uniform heading in the first place.

The second tenet is the principle of least effort, which holds that if we set up systems which make it easy to accomplish efficient retrieval, then more people will succeed in accomplishing it. (2) Conversely, if we set up systems that make it difficult to accomplish efficient retrieval, i.e., that add extra steps, require more prior knowledge, have more exceptions, or scatter rather than link or group resources, then, inevitably, fewer people will succeed. Nor can we blame readers for laziness, as if they are at fault, if they fail to run a longer or more difficult obstacle course; for, if the overall system is difficult to use then it is the planners of the system, and not its users, who are responsible for its resultant performance. We need to consider LOCIS and the encyclopedia plan within this context.

Cleaning Up PreMARC

There has been progress in planning, specifically as reflected in the Report of the PreMarc Database Planning Group (11/84) and the Research Services Ad Hoc Group on Premarc's 1985 study, Enhancing PreMARC. Two points are not addressed in these reports:

1) Given that the database consists of five million records--reflecting the work of hundreds of catalogers over eight decades--it is inadvisable to make plans on the assumption that the database can be cleaned up in only a few years. Since the outlook for staffing increases at LC is not good, more likely the editing will take decades. And, in the meantime, access which we offer to our incomparable collection of older materials must not be any less than it is now.

2) In cleaning up the database, particular attention should be paid to updating obsolete subject headings to current terms. The plans that have been advanced so far concentrate on only two of the three problems of the records: the need to key in missing fields, e.g., subtitles, contents notes, series statements, and to correct miskeyings, i.e., word misspellings and field mistaggings. Both need to be done, but such measures leave untouched the problem of split files being created between old and new headings, a violation of the principle of uniform heading. For example, it is desirable to correct the multiple forms of the old heading "Oswiecim (Concentration Camp)," which are now scattered under four misspellings of "Oswiecim," two of "Concentration," and one of "Camp." But, even better would be to change the old heading to the current one ("Auschwitz"), so that the 144 records under it will be found where Holocaust scholars are likely to look for them. (The change was made long ago in the card catalog.)

The existence of a good cross-reference structure has a material bearing on whether or not scholars will find a given term in the first place, and plans are well under way to put the LCSH headings and cross-references online. The problem for PreMARC records is that the current network of terms does not adequately pick up references to and from terms that are obsolete.

Rather than create a greatly extended, complicated, and unwieldy cross-reference structure that would absorb these "orphans," a better solution would be to update the old terms so that they fit into the current network. This, however, needs to be done in a systematic fashion, not simply on an "as reported" basis; the latter hit or miss approach will offer at best a partial solution and will greatly extend the period during which PreMARC must be considered a backup avenue of access rather than our primary source.

The proposed retrospective conversion or RECON project, in which LC would cooperatively use records created by other libraries to upgrade our own files, offers another useful but still partial solution. It may well take as much time and effort to clean up other libraries' subject authority work as it would simply to attack PreMARC directly; and, in any event, we need to be mindful of one of the surprising and hard-won lessons of the compilation of the Pre-'56 NUC, that it would take hundreds of cooperating libraries and not just a handful of large libraries to provide a database large enough to be of much use to LC's retrospective conversion. (3)

If we are going to address updating subject headings, and not merely rest content with adding missing fields and correcting miskeyings or obsolete terms, then we have to recognize the time problem. It will take longer to clean up PreMARC if we deal with the subject headings than if we ignore them. It will take longer still if we rely on the more "hit or miss" methods of correcting headings "as reported" or via RECON. In any event, the time problem for a clean-up is likely to be one of decades. We need to assure that alternative avenues of access that are at least comparable to what we have now are retained during this long interim.

Saving the Pre-'81 Card Catalog

The questions that have come up concerning the

retention of the card catalog have been two: "Even through PreMARC records are truncated, don't the new software capabilities which allow key word, call number, and Boolean combination searches compensate adequately for what is lost?"; and "Why wouldn't the K.G. Saur microfiche be adequate as an interim replacement?" Both questions are important.

The component word search capability of PreMARC will not save present levels of subject access because millions of key words from subtitles, contents notes, and series statements were never entered into the database in the first place, and one cannot search for or combine words that do not exist in the file. Moreover, the key word searches on terms that are likely to occur to readers, e.g., "Auschwitz," "Airplanes," do not appear on most of the older records with obsolete headings ("Oswiecim," "Aeroplanes"), and thus the older records will not be retrieved. Therefore, scholars are likely to be misled into thinking they have done better searches than they really have. (Among the subjects for which PreMARC hides hundreds or thousands of records under practically unfindable terms are the Holocaust, World War II, the Civil War, genealogy, and women's history; in each of these areas we serve vocal constituencies.)

Searches by call number (either in PreMARC or shelflist microfiche) will not recreate the destroyed uniform heading subject groups, because call numbers scatter many aspects of a subject (historical, social, legal, educational, fictional, technical, bibliographical); many classes for subjects, like LC subject headings, have changed over time, and searching by current numbers will miss retrospective materials; the basic accuracy of class numbers cannot be trusted in PreMARC--we must recall that the people who keyed them in are the same people who keyed in 22 different spellings of "United States"; and, the technique of searching by call number in LOCIS or fiche is one with which people are simply not familiar.

The MCat Microfiche

If the complex software features of PreMARC at present cannot preserve current levels of subject access, primarily because of the contents of the file, then, we need to consider next whether the K.G. Saur microfiche will be adequate for the task. The professional reference staff of GRR strongly believes that the microfiche will not be adequate for the purpose of retaining the minimum current level of access necessary for the success of the central index of the encyclopedia plan.

The first problem is that preserving the contents of the card catalog on microfiche does not preserve the same access to the contents. The next problem is that up to now we have been planning as though PreMARC can serve as the primary avenue of access in the next few decades, and as though the Saur fiche can serve as a backup. But since PreMARC itself, until it is cleaned up, cannot be more than a backup, this thrusts upon the fiche the role of primary avenue of access to our huge retrospective collections, a feature role for which it was never designed. Its problems are: 1) roll-fiche does not allow random access; 2) it erases the color-coded distinction between subjects and titles that appears in the card catalog, and, in effect, requires all users to have an expert's prior knowledge of LC's complicated filing rules; 3) it lacks some cross-references which Saur has skipped in the filming process; and 4) it requires both horizontal and vertical scanning of records, which is not unlike forcing a user to read a newspaper by looking through a cardboard tube that prevents him or her from seeing the full page. Such reading can be done, but if there is a more attractive alternative--such as a "state-of-the-art" computer that will provide a printout of "everything"-- then the principle of least effort will assure that most users will flock to the attractive system and disregard the more difficult one. In other words, we will have created an overall system which makes it very attractive and easy to get bad results and quite difficult to get good results. We will have made quality research something that can be done only by going against the grain of the overall system.

Making It Easier

If the central index is to live up to its potential for tying together the universe of knowledge, considerable concrete, systematic, and formal planning is needed to bring to researchers' attention to the whole range of access systems we have which supplement LOCIS. In addition to LOCIS's post-coordinate search capability and our unparalleled collection of bibliographies, we also have a collection of indexes which, in aggregate, provide quite different subject access through pre-coordinated controlled vocabulary headings to journal articles and other sources in any subject field. We have another collection of indexes which, in aggregate, provides quite different retrieval results--again, in any subject field--through "uncoordinated" key word indexing of journal articles and other records. We have a third collection that provides still different subject access in any discipline through citation indexing. (The latter enables a researcher to find out if any given source has been cited in the footnote of a subsequent journal article.) And, we have yet another set of sources which provides access via the National Referral Center database to people contacts and experts in all fields. All of these systems are potentially of equal importance with LOCIS in revealing knowledge records because each of them can to something important that LOCIS cannot; some of them are even preferable for establishing cross-disciplinary connections.

If we create a central index in which the computer is properly balanced by these several other systems and in which we make it easy for people to perceive LOCIS within a larger context, the potential of the encyclopedia plan will be realized. Indeed, with an arrangement like this, LC could finally become a model for other libraries in reference service, just as we already are in cataloging, automation, and preservation. Without such an index, or with an index weighted primarily towards PreMARC and microfiche for access to the wealth of our retrospective material, we will have violated important principles and greatly compounded, rather than solved the problem of scattering and fragmentation in the universe of knowledge. (4) The new technologies are not ends in themselves, but they must be planned for within a larger context, and their use must be governed by the principles of our profession.

Thomas Mann
General Reading Rooms Division

1. See, for example, Lois Mai Chan's Library of Congress Subject Headings: Principles and Application (Littleton, Colo.: Libraries Unlimited, 1978), Chapter

2, "Basic Principles," pp. 24-25. The principle discussed here as applied to subject headings has close analogies for uniform titles and name authorities.

2. See Don R. Swanson, "On Improving Communication Among Scientists," Bulletin of the Atomic Scientists, February 1966, p. 9 for a "principle of least action" which states, "The design of any future information service should be predicated on the assumption that its customers will exert minimal effort in order to receive its benefits. Furthermore, they won't bother at all if the necessary minimum is higher than some fairly low threshold." See also Victor Rosenberg, "Factors Affecting the Preference of Industrial Personnel for Information Gathering Methods," Information Storage and Retrieval 3, (July 1967), pp. 119-127, a statistical study which concludes that "the ease of use of an information gathering method is more important than the amount of information expected for information gathering methods ...regardless of the research orientation of the users" and that "the basic parameter for the design of any industrial information system should be the system's ease of use, rather than the amount of information provided, and that if an organization desires to have a high quality of information used, it must make ease of access of primary importance." See also, Pauline Atherton, Putting Knowledge to Work: An American View of Ranganathan's Five Laws of Library Science (Delhi: Vikas, 1973), pp. 122-123 for a "principle of least action"; George H. Haines, "Process Models of Consumer Decision Making" in Buyer/Consumer Information Processing (Chapel Hill: University of North Carolina Press, 1974), pp. 96-97 for a "principle of information-processing parsimony"; and James R. Dwyer, "Public Response to an Academic Library Microcatalog" in The Card Catalog: Current Issues (Metuchen, N.J.: Scarecrow, 1981), pp. 164-170. It is not without interest that a "principle of least action" is also a basic tenet of mechanics and physics; cf. H.W. Turnbull, The Great Mathematicians, 4th ed. (New York: New York University Press, 1961), pp. 50, 84, 111, and 118, and The Conservation of Energy and the Principle of Least Action, edited by Bernard Cohen (New York: Arno Press, 1981).

3. See Gordon R. Williams, "The National Union Catalog and Research Libraries" in In Celebration: The National Union Catalog, Pre-1956 Imprints (Washington: Library of Congress, 1981), p. 14.

4. A few years ago the editors of the Encyclopedia Britannica changed its structure to provide different levels of access through an introductory "Micropaedia" and an in-depth "Macropaedia." Subsequent reviews roundly blasted the set because it lacked a comprehensive index to both parts that would tie them together. Now, in 1985--in response to very strong criticism from librarians--the company has finally produced a separate two-volume index which establishes the necessary links.

SUBJECT ACCESS IN THE LOCIS ENVIRONMENT

Although many library patrons already know exactly which books they want, most of the public and Congressional reference staff at the Library of Congress would probably agree that the majority of inquiries are posed in terms of looking for materials on a particular subject. Thus, providing "subject access" to the Library's collections is fundamental to the information needs of the general public, students, scholars, Congressional users, and LC's own staff. In addition to the traditional means of subject searching--card catalogs and printed indexes and bibliographies--we now have to consult the computerized files which constitute the Library of Congress Information System (LOCIS). With the closing of the card catalog, LOCIS has become the only source of a growing segment of our cataloging data and its use obligatory for almost all staff and readers. Understanding how it helps and hinders subject access is basic to providing effective library and information services.

Subject access is not a new concern in library literature. Well before the advent of computerized systems, librarians were examining the effect of indexing vocabularies, catalog arrangement, and information-seeking behavior on the success of subject searches. The development of online public-access catalogs has brought all of these factors together in the attempt to design systems with maximum capabilities and minimum user difficulty. A significant body of data on subject access has emerged from catalog use studies and is the focus of several researchers. (1) A fairly comprehensive definition of subject access was quoted recently by Pauline Cochrane, one of the major authorities in this field: "The approach may be systematic (as in the classified arrangement of books on a library shelf) or topical (as in the subject headings in the catalog) or the approach may be natural or free (as in the title words or words in an abstract or subject description if they are used for matching query words)." (2)

Surveys of the use of LOCIS have repeatedly shown the high proportion of subject searches performed by all types of catalog users, and the above-average use of catalogs at LC in general. (3) In fact, general research indicates that even many author or title searches actually may be "disguised" subject searches. (4) LC readers may search by subject to a greater extent than average both because our closed stack system permits less browsing, a typical means of finding out what there is on a certain topic, and because the vastness of our collections leads even knowledgeable researchers to want to just "see what there is" in our files. In the context of the literature noted above, there seem to be several questions to be answered about the impact of LOCIS on subject searching. First, how does LOCIS provide subject access, and how is it integrated into reference services? Second, what are the obstacles to subject access in the LOCIS environment? Third, how well is LOCIS actually working, and what more could it be doing? Fourth and last, what are the future prospects for subject access, both in LOCIS and in system developments outside the Library of Congress?

Features of LOCIS

In answering these questions, this paper focuses primarily on the bibliographic files within LOCIS. LOCIS comprises two retrieval systems, SCORPIO and

MUMS, which at this point include cataloging data for books, serials, maps, and music, and separately-accessed name authority and union catalog records. Each category of records dates from a particular year when input began. SCORPIO also includes specialized non-bibliographic data bases for legislative and directory information which will only be briefly noted here, operating more as individual reference tools than as integral components of a subject catalog of the Library's resources.

Benefiting from the dual evolution of SCORPIO and MUMS, LOCIS provides four distinct means of subject access through keyword commands and browsable indexes. The full Library of Congress subject headings (LCSH) can be browsed in alphabetical order, with or without subdivisions, similar to using the card catalog. Keywords can be retrieved directly from the LCSH fields in the records, without having to browse the heading in its exact form. Author, title, series, and notes fields can also be searched for subject-related keywords. Finally, and again important in a closed-stack library, one may browse by classification number. Although the complete call number is not browsable, this index is more accessible to the public than the card shelflist and more readable and up-to-date than the microfiche shelflist.

These access points offer unique advantages over the card catalogs. Full Boolean operations (and, or, not) may be performed using whole headings, particular subdivisions, class numbers, or keywords from any combination of fields. Sets in SCORPIO may be limited by date, language, class number, fixed field codes such as geographic area or intellectual level and other factors, while MUMS commands can be restricted to searching certain files or fields. The MUMS keyword abilities provide powerful retrieval of countless combinations of author, title, subject, and other keywords in the record, including untraced fields such as contents notes, translators, and series. These help overcome problems with spelling, multiple headings, and complicated form or corporate headings. Proximity modifiers are available in MUMS, but are not used as much in bibliographic searching as they are in keyword searching of text in the SCORPIO legislative files. Although commonly assumed that it is difficult to retain online the random serendipity of browsing in a card catalog, there are some advantages to browsing in SCORPIO. For example, one may directly search subdivisions of both subject and corporate headings. It is even possible that, given the size and filing complexity of LC's Main Card Catalog, users are more likely to get to the desired heading right away when browsing it online.

LOCIS and the Reference Environment

Whatever its particular characteristics, LOCIS is but a part of the total reference setting and its functioning affects other reader services. Not just an isolated finding aid, it must be used together with card catalogs, printed indexes and bibliographies, and is itself a principal means of general bibliographic and topical verification. Thus, we need to consider the consistency of LOCIS and other reference tools with regard to coverage, terminology and structure and how these interrelate in providing subject access to information.

The computerized data bases do not constitute a comprehensive catalog of the Library's holdings even for books, let alone for serials and special collections. Where most library users expect to find separate card catalogs for different types of materials, something about the computer leads people to assume that everything is in it and that it is universally interconnected with external data services. Public service staff must continually remind patrons of the exact contents of LOCIS and emphasize the need to consult other catalogs, finding aids, or even other libraries for a complete search. Confusion is also caused by the fact that some SCORPIO files such as the legislative bill digests or National Referral Center directory have nothing to do with the catalogs or with specific LC collections. These files have valuable subject content, but may not be consistent with other segments of LOCIS in regard to vocabulary, display format, or the nature of the actual items reflected.

Although subject headings in the book files in LOCIS are the same as those in the card catalogs and in some printed indexes, search techniques obviously differ. Further inconsistencies arise with some SCORPIO files which use their own thesauri, and in switching between LOCIS/LC card catalogs and the numerous printed indexes and bibliographies which use specialized terminology or forms of keyword access. However, the overwhelming problem for both staff and the general public is that LOCIS does not operate like any other manual or automated system, is not self-teaching, and requires varying amounts of instruction to use effectively. Its retrieval potential and relationship to collections and catalogs cannot be fully realized until the obstacles to easy and direct use are analyzed and overcome.

Obstacles to Subject Access

LOCIS is a new machine that uses old stock parts: the same bibliographic data that formerly went into the card catalog now gets entered into a computer. As a result there are two distinct kinds of problems, those that were there all along but are now more acutely visible, and those that arise explicitly from the automated system. Some conceptual problems in searching are the same as in the card catalog, but become more difficult in LOCIS, as the structure of the database forces patrons to confront descriptive and subject cataloging rules when they did not expect to, or do not know them.

The traditional means of subject access dates from the early part of this century: the Library of Congress subject heading scheme (LCSH). Despite many critiques from American and European librarians (5), its structure has changed little; practices designed to make searching physically efficient in a card catalog have been retained in an automated system which has the ability to overcome such physical limitations. To choose the best headings, readers may need to understand concepts of indexing depth and specificity since LC only catalogs for the general subject of the entire work and does not assign books to both broad and narrow categories. This causes difficulty both in topical headings and in geographical ones. LOCIS searchers intuitively seek to post-coordinate numerous terms, whereas MARC records contain two or three (at best) pre-coordinated, subdivided, inverted, and parenthetically qualified headings. Some headings are harder to browse in SCORPIO because the indexing program splits up the elements of corporate, analytic, and form headings, and doesn't display all the subfields in some headings. While proposed enhancements may improve the browse index soon, readers

currently need to pursue complicated steps to select and combine the separate portions of the headings or to weed out items lumped together in the index. Presuming they realize there's a problem, and ask how to get around it! Luckily, the keyword search in MUMS makes these headings easier to locate than in either SCORPIO or the original card catalog for which they were created. Keyword access to titles helps compensate for the conservative and slow addition of terms to LCSH, but not for recently changed name and subject headings where records exist under each version without online cross-references.

Subject access is the same as author/title access when it comes to the "mechanical" aspects of using LOCIS, that is, one must learn a sequence of artificial, non-standardized commands and be able to execute them with few prompts or online aids. To fully profit from LOCIS, one must actually learn two sets of commands, for SCORPIO and MUMS. These are the new obstacles which occur only in the context of the automated catalog and which necessitate a major investment in staff time for training and preparing documentation.

The online book files do not integrate cross-references, and distinguishing among author, title, and subject entries in the browsable indexes is rather subtle; it is all too common to select pages of titles when a subject is desired, or never to get to the full records at all from the index. The syndetic structure of the card catalog is essential when working with a system like LCSH. In using LOCIS, staff must explain the use of the printed LCSH lists, an extra step in subject searching not taken by many patrons on the assumption they can go directly into the files and find pointers to what they want. Further, not all SCORPIO files use the same subject headings, principles of geographic subdivision, numbers and specificity of headings, and form of corporate entry. However, these latter files, mostly nonbibliographic and designed expressly to operate online, contain greater numbers of descriptors per item, thus increasing the likelihood of successful subject retrieval.

Keyword searching seems like a panacea, but does create its own problems because of non-searchable stopwords, "false drops," and huge numbers of items retrieved with poorly-worded commands. Spelling, spacing, and punctuation are crucial, and when browsing, the exact form and order of the headings and subdivisions. Some browsing goes very slowly; the whole heading may not be displayed, or there may be many, many screens for headings with numerous subdivisions. The user may repeatedly select, display, and return to the index just to scan records under a smattering of headings, because unlike browsing in a card catalog, the whole entry is not seen as one flips through.

When browsing or displaying entries in LOCIS, the filing order of headings and of the actual records is different from the card catalog, and the individual display formats vary among the databases. Although the filing order in MUMS depends on the command used, all subject searches in LOCIS are sorted by card number; the chronological arrangement suits some needs but is hard to check against alphabetical lists from the card catalog or other bibliographies. The brief results of keyword LCSH searches do show one subject heading for each record retrieved, but since it is not labeled as such and is usually the one already specified in the initial command, this may not give the user any additional searching clues.

Command Performance

How well is LOCIS working? Both small and large scale studies have attempted to answer this question, and to elicit ideas for improvement. A 1979 survey of 123 SCORPIO users found that 76 percent were doing subject searches. (6) Even graduate students and faculty showed this high percentage of subject searching, contrasting with earlier [card] catalog use studies. Of those whose most recent search was by subject, 73 percent indicated that they browsed randomly under some work, 5 percent used LCSH, and 11 percent said they used LC classification numbers. Since call number searching is not common among public users, it is likely that some respondents misunderstood the question, highlighting further the difficulty of making effective subject searches. About half the respondents had also used the card catalog, and 62 percent of those looked under subject; most users tended to rate SCORPIO as easier for all searches, even when the option given was not available online, for example, finding cross-references. The main impediments cited by users were "figuring out what to do when problems occur," and the lack of coverage of serials and older materials.

These findings were confirmed and extended by a major study begun in 1981, sponsored by the Council on Library Resources (CLR) and carried out in cooperation with a group of public and academic libraries across the country. The CLR study has generated a substantial number of follow-up reports and articles in which the issue of subject searching features prominently. (7) Across all libraries, 53 percent of online catalog users were trying to find books on a topic; 44 percent came with a specific subject heading, and 29 percent with topic-related words in mind. LC readers are more apt to do subject searches than those at other libraries surveyed, especially when they are infrequent visitors; 69 percent of all LOCIS users were searching by subject, but only 62 percent of those who use LOCIS every day versus 75 percent of those for whom it was the first search. Of the over 480 users responding at LC, 88 percent think the online catalog is better than the card catalog and 78 percent have a "very favorable" attitude toward the computer. (8)

One of the most interesting findings of these studies was that perceptions of search success were strongly related to the types of search, and that patrons looking for a topic were noticeably less likely to be satisfied with the results. The questionnaire asked about such factors as understanding displays, using codes and abbreviations, entering commands, carrying out subject and known-item searches, and system delays; of the thirteen systems in the study which supported subject searching, LC ranked very high for subject and known-item searching but rather low for understanding codes, commands, and displays. Nonetheless, systems that actually displayed subject headings, like SCORPIO, and those that allowed keyword searching, like MUMS, ranked higher overall. (9) Specific comments at LC included trouble finding the correct subject term and increasing and reducing the size of sets. In focus group interviews, users spoke often of a need to improve the system's browse mode, for example, by putting more information in a browse display and by putting in a mechanism for revealing the scheme of subject headings. (10)

These studies have led library researchers and system designers to propose a number of features that should be present in an online catalog to provide good subject access even without changing the content of the basic records. These include 1) display of

cross-references and automatic linking with bibliographic records; 2) a separate search interface or index for subjects; 3) kwic/kwoc indexes or rotated lists of headings and titles; 4) menus and prompts to help choose headings, expand, or contract sets; 5) displays which show headings retrieved or "near matches" as alternatives; 6) the ability to automatically search additional headings and class numbers listed in the records retrieved; 7) hierarchical searching through a "tree" of headings and/or classification numbers. (11)

The Outlook for LOCIS and Subject Access

The prospects for improved subject access reflect trade-offs related to staff and users, costs and effort: more emphasis at the input stage (indexing techniques, system design) may make searching and training easier, but will cost more and take more time. At LC, the programming and cataloging needs of general public services, special collections, technical services, Congressional research, library administration, and copyright registration must be juggled into a master list of priorities. Major changes in the system or in the content of the MARC records are not likely; however, some projects already underway will increase the availability and utility of existing data and system features.

An advisory group of reference, processing, and automation personnel is working to implement online browsing of the LC subject heading list, complete with cross-references. The LCSH would still be in a separate database not automatically linking with bibliographic records and requiring more staff explanations, but represents a necessary step toward a self-sufficient online catalog. In 1986, a series of enhancements to the SCORPIO indexes (ASO Task 277 as amended) should expand the amount of information indexed and displayed by the browse screens, including further portions of author names, subject subdivisions, and complex corporate and form headings. Lastly, a facility for writing specialized tutorials and documentation is in use within individual departments to assist both staff and readers, and may serve as a "front-end" processor for new or infrequent users.

Looking beyond the Library of Congress, researchers propose enriching bibliographic records with abstracts, additional headings, and terms from the table of contents, and index of a book. (12) Systems analysts are not only suggesting subject search and display features such as those listed above, but sophisticated front-end query systems which use advances in artificial intelligence programs to more automatically translate from user to system language and which integrate numerous online aids. And, we all want to achieve what so many library patrons have taken for granted with card catalogs: standardization of search commands across online systems.

LOCIS is a powerful tool for subject access, but it will always be only one of those needed by LC readers. In an environment responding to a heavy load of subject requests, there are still serious obstacles to effective subject searching which mandate continued work on better systems, records, training, and service.

Sarah Pritchard
General Reading Rooms Division

1. See for example K. Markey, Subject Searching in Library Catalogs (OCLC, 1984); P. Cochrane, "Modern Subject Access in the Online Age," 6 pts. in Am. Libs., Feb.-July 1984; C. Mandel, "Online Subject Access," JAL 9 (July 1983); J. Matthews et al., Using Online Catalogs (Neal-Schuman, 1983); LRTS Jan.-Mar. 1985, whole issue; and N. Williamson, "Subject Access in the On-Line Environment," Adv. in Librarianship, v. 11 (1985).
2. Cochrane, "Modern Subject Access," op. cit.: 81.
3. Pritchard, S. SCORPIO: A Survey of Public Users of the Library of Congress System (L.C., 1981; ERIC-ED 198801): Anderson, R. et al., Library of Congress Online Public Catalog Users Survey (L.C., 1982: ERIC-ED 231384).
4. Lipetz, B. "User Requirements in Identifying Desired Works in a Large Library." (Yale Univ. Lib., 1970; ERIC-ED 042479).
5. Cochrane, P., and M. Kirtland. "Critical Views of LCSH." (ERIC Clearghs. on Info. Resources, 1981; IR-53).
6. Pritchard, op. cit.: 15-18.
7. For full report see Lawrence, G., and J. Matthews, Detailed Analysis of the CLR Online Catalog Project (ERIC-ED 242332), revised in Matthews et al., Using Online Catalogs. A list of all study documents is in Matthews and Lawrence, "Further Analysis of the CLR Online Catalog Project," ITAL Dec. 1984.
8. Anderson, op. cit.: 10-11.
9. Matthews and Lawrence, "Further Analysis:" 362, 365.
10. Anderson: 12.
11. In addition to the above, see R. Aluri, Subject Access to Catalog Records in Large Bibliographic Databases (PhD. diss., DAI 81-22155); Cochrane, Subject Access in the Online Catalog (OCLC, 1982; ERIC-ED 215686); N. Kaske and N. Sanders, "Online Subject Access: The Human Side of the Problem," RQ, Fall 1980: 52-58.
12. See Mandel, "Enriching the Library Catalog for Subject Access," LRTS, Jan.-Mar. 1985: 5-15.

CATALOG CONUNDRUMS: A USER'S VIEW

In "American Notes" in the April 12, 1985 issue of The Times Literary Supplement, Christopher Hitchens lamented the announced intention of the Library of Congress to do away with the card catalog in the Main Reading Room of the Jefferson Building: "Part of the joy ...is the business of pulling out the smooth drawers and going through the beautifully arranged cards. As any reader knows, the pleasure lies in what you find while you are looking: in the distractions from the main quarry."

In that one statement, Hitchens has encapsulated the tensions on both sides of the issue surrounding the replacement of the card catalog with a computerized catalog. I take the opportunity provided here to explore those tensions as seen by someone like myself--a daily user of the facilities of the Library of Congress. I am not a cataloger, not trained in library science, not versed in the subtleties of Cutter numbers. On the other hand, while I do not consider myself knowledgeable in all the ways of SCORPIO, MUMS, MARC, and PreMARC, I am familiar with the operating systems of computers and do, myself, use them regularly in my work. I am not, what you might call "computer shy."

Romantic Claptrap

From those impatient to get on with the change to a computer catalog, one often hears the complaint that most objections are nothing more than romantic claptrap. They tire of hearing old researchers speak lovingly of the sensation of flipping the cards, one after the other. They grow impatient with descriptions such as Hitchens': "...the joy...of pulling out the smooth drawers and going through the beautifully arranged cards." One must not fall into this trap. The old way is not always the best way. One must not let the comfort of familiarity determine the course of action.

But, there is the obverse danger: more and more, we identify technological innovation with the Baconian concept of progress. The fact that something can be done is all too often being used, these days, as justification for doing it. There are no better examples than from the computer industry itself. Recent innovations in miniaturization have given us the ability to build very small machines with relatively large amounts of computing power and memory. Any home can house a computer. But do we really need all that power to keep a checkbook balanced?

Searching for Information

There are two reasons for consulting the catalog. The first is to discover what it is the Library has on a certain subject. It is the process of building a useful research bibliography. Almost always, my entry to the catalog in such a search is via subject headings. The second reason is to identify the call number of a particular item, so that one can obtain the item itself.

There is no question that for calling items up, the computer is a far superior tool to the card catalog. Suppose that I am looking for six or seven items. With the card catalog, I have to consult several drawers--almost always not adjacent to each other--and ferret out the one card containing the information for which I am looking. Doing the equivalent task on the computer is much easier and faster. When searching for a call number, I almost always use MUMS and search by author/title, title, or author, depending on the information I have available. One can do an extensive search in very short order.

The computer has but one disadvantage to the card catalog when it comes to identifying call numbers. When I sit before the terminal, I tie up the entire catalog at that terminal. When I go to the card catalog, I never tie up more than one drawer. Hundreds of people can use the card catalog at the same time. On a busy day, that is often the case. For hundreds to use the computer catalog, hundreds of terminals are required. On a busy day in the Main Reading Room, I am often discouraged from using the computer for trivial searches because of people waiting for the terminals.

The Architecture of the Card Catalog

In searching for bibliography in the card catalog, the architecture of the catalog is an aid to the search. In the first place, all subject heading cards are identified by the red edge. Second, all the cards within a single subject heading are alphabetized. This means that where more than one edition of a work has been produced, one card follows the other in an orderly fashion. Third, at each point in the card catalog where it is needed, one encounters cross-references to other subject headings or to other author or title entries that might otherwise have gone unsuspected. And, most important of all, as one goes through the catalog, card by card, it is not the familiar and pleasing look or feel of the card that is so important; what is useful is that one is immediately presented with all the publication data that was originally available to the cataloger, including an organized description of the item, cross-referenced subject headings, and publication information. None of these conveniences are now available in the computer catalog.

The Computer Catalogs

At present in the computer catalog, there is no distinctive separation of subject headings from other kinds of headings. This could be solved either by using color monitors and rendering subject headings in different colors or, on a monochrome monitor, iconographically.

As it now stands, entries gathered together by the computer under a given subject heading are organized not alphabetically, but by LC card number. In other words, the order of the entries is a function of when the Library first took note of the item. I find this organization particularly disconcerting. Regardless of how a catalog is ordered, at some point one expects to deal with an alphabetical list. But custom and habit aside, as it stands now, multiple editions of the same work in several languages pop up in a most confusing, time-wasting way. I invite the reader to browse under RELATIVITY (PHYSICS). Under that rubric one finds a book written by Albert Einstein for a lay audience the title of which, in English is, Relativity, the Special, the General Theory. It is a book which first appeared in 1917, went through seventeen editions in Einstein's lifetime and is still in print. Have fun!

Of course, the computer catalog could be modified to render items alphabetically. But, having written alphabetization programs myself, I appreciate the fact that there is considerable programming involved and that the computing time for organizing entries under a subject heading will go up by several orders of magnitude.

The computer catalog now contains no built in cross references by subject heading. One must always consult Library of Congress Subject Headings (LCSH), complete separate searches and then, if desired, combine the whole thing. If one does this for all subject headings that might pertain to the history of the building of the atomic bomb, restricting the search to English language entries, one obtains 1,850 hits. While it is true that many of those hits are varying editions of the same work, it is a dizzying, discouraging, and disheartening specter that one confronts. I have actually seen people sitting at the computer catalog for long periods of time, printing out the "fruits" of such a search.

One of the most insidious problems with the computer catalog is the errors it contains. At best, they are bothersome and at worst, they mean that thousands of items may be buried in the system. If one consults my old friend RELATIVITY (PHYSICS), one obtains about 350 hits in LCCC and and about 650 in PreMARC. It turns out there is more than one heading;

variations such as RELATIVITY PHYSCIS [sic] exist. Never in my experience with the card catalog have I found a significant typographical error. The very nature of the process of building the catalog precludes the possibility. Furthermore, there are several instances in the computer catalog where items are sequestered away under subject headings no longer used and which no longer even appear in LCSH, again, a phenomenon which is precluded in the card catalog by the very nature in which it is built. The only solution to these problems in the computer catalog is constant vigil, not only with regard to proofreading, but with regard to making sure subject headings in the catalog correspond, one-to-one with headings in LCSH.

In the computer catalog, one normally sees only an abbreviated version of the information on the card catalog entry. To see all of the information, one has to instruct the machine. In my experience and that of many researchers to whom I have spoken, one tends to avoid going to individual entry as excessively time-consuming; thus, a great deal of information is lost. The winnowing process, which should take place at the beginning of the research activity, often does not take place until the item itself is called for and appears. In the long run, much time and effort are needlessly consumed.

Building a Catalog

The structure of the card catalog did not emerge overnight. Its architecture was undoubtedly shaped by decades of the shared experiences of users, reference librarians, and catalogers. The computer catalog in the Library of Congress is now a poor substitute for the card catalog for those of us using the catalog as a research tool.

There is no reason why the same kind of evolutionary process will not occur with the computer catalog, however. It would make sense though, to begin with an architecture which imitates the best that is currently available--the card catalog. A new program should be added to the computer memory. Perhaps it should be called "CARD". When called up, it would present the user with the entries in word-by-word alphabetization in precisely the same order that one finds in the card catalog: persons, places, and things. The user could define the size of a drawer by specifying the alphabetical range over which the search is desired, and once that is done, individual item entries could be presented, one at a time.

There would still be problems. When one sits at a terminal, the entire catalog is tied up at that terminal. In order to provide the use-efficiency for the card catalog, hundreds of terminals would be needed. They are expensive, they would take up a great deal of room, and a item-by-item search would take up more time than is required at the card catalog. The terminals also would require the services of a good number of reference librarians. This is because--unlike the easy access that any novice has to the card catalog--for most of us, the special language one has to learn in order to get at the computer catalog is a forbidding barrier. As it stands, one must take a class in which an introduction to the most elementary set of commands and sorting features of SCORPIO are given.

The upshot of all of this is that rather than making more of the contents of the Library more available to a wider range of serious users, the problems with the computer catalog make less of the Library less available to a narrower range of serious users. Surely that is not what is intended.

Solutions

Earlier, I pointed out that a computer was a poor tool to use for keeping one's personal checkbook in order. For the task at hand, the amount of programming time (or cost of buying a packaged program) is excessive. Using the computer makes the task more labor intensive than using a simple calculator and a notebook for keeping track of tax-related expenses. This is an example of being swept along by what I often call the "technological fix".

What I have said about keeping a personal checkbook, however, does not apply to a corporate checking account. At some point, the use of a computer becomes a desirable innovation. It is a function of size and complexity. (Another view is that the availability of the computer allows corporations to become more structurally complex.)

I have no doubt that the computer catalog is here to stay. It allows access to the current catalog from anywhere in the world. Nothing is better able to provide information on the location of individual items and for specialized, restricted searches. But, for the bulk of the users of the Library, it is a slow, mysterious, inefficient albatross.

There is no reason why both a computer and a card catalog could not be maintained. It is sometimes argued that there is not more room for card files. That makes no sense at all. There seems to be plenty of room for more computer terminals. It is sometimes argued that the card catalog is too expensive to maintain. As I have already suggested, maintaining the computer catalog is not going to be cheap, and it is not clear that it will really be cheaper than cards. If the truth be known, keeping the computer catalog accurate and up-to-date is going to be as labor intensive as keeping any catalog accurate and up-to-date.

The Library of Congress has recently undertaken a major renovation program of many of the public spaces in the Library, including the Main Reading Room in the Jefferson Building. As I look down on the reading room from my current scholar's desk space, in my mind's eye, I have conceived of at least three designs which would preserve the wonderful character of the reading room and provide more than ample space for a card catalog for the foreseeable future and beyond. It is not that the old way is the best way, because it <u>is</u> the old way. In this case, the old way is the best because, for the bulk of the serious users of the Library, it still works best.

Stanley Goldberg
Smithsonian Institution

ELECTRIFYING OBSESSION

"Not yet. No, not yet."

Peck ... peck ... bing. Click; click.

"Ahhh."

Peck; peck. "Yes. 'Unverified record.' Indeed!"

Peck ... peck ...peck.

As if it were not bad enough to be searching for the great classics on a plastic and metallic box, I had to put up with the extremely clamorous antics and wild cacophony of a rather wizened-looking gnome to my left who was also sitting at one of the eighteen gray boxes in the Library of Congress' Computer Catalog (Nota bene: NO 'ue') Center -- the "CCC", I learned, to the initiated.

I was in town for the annual APA meetings; having read my paper on the effects of gastric distress on the pronunciation of the initial labial in attic Greek, and having received scarcely due recognition, I had accepted the suggestion of a colleague of mine who had described his great success on LOCIS, SCORPIO, MUMS, and a great many acronyms of an obfuscatory nature.

Here I sat after a kind but not entirely successful effort on the part of a reference specialist to teach me "key word searching" on MUMS. It all seemed straightforward enough, but my gnashing of teeth at the omission of the diacritics almost led to an altercation with the hapless specialist, whose harried eyes had glazed over at the very mention of those forgotten, to him, meaningless, markings.

Peck ... peck ... beep ... **bang**, as my bay-mate smashed his hands down on the keyboard of the terminal. "If you try really hard, you might be able to break it," said my kindly specialist with a fixed regard on my mate.

"Sorry," was the barely audible reply, as he returned to his efforts. And what neo-Herculian efforts they appeared to be. One entry after another; one beep after another. A smile. A sigh. His narrow shoulders then slumped, then erect. An unutterably proud look of triumph alternating rapidly with one of defeat. I confess that my study of the use of the triphthong in Pindar paled beside my curiosity to know what was so driving this man.

Bang.

Rather than endure another censorious remark, he instantly arose, gathered together his wad of papers and left. Tiring of my boolean efforts, I followed and, using a conspiratorial approach, successfully ended by sharing coffee with my prey in the dubious snack bar of the venerable building. I easily got him to tell me his history, which proved just reward for my efforts.

A successful doctoral candidate in political science from the University of *, his book had been published in 1967, the very year he had taken a position in Kabul to teach political theory. Upon his return, only two years ago, he visited the Library of Congress and with natural curiosity, attempted to find a record of his work in the Card Catalogue, only to find none. Perplexed, since the work had received favorable reviews, his agitated query to the reference staff introduced my newly-discovered friend to PREMARC, or the automated file of books catalogued before 1968. But what a record! My friend's name, Aloysius Cranfield, had become Alice Cranfeld! and his magnum opus, The Tactical Politics of Subservience, was enshrined as The Tactful Polities of Servants! Never the calmest of men, my friend resolved upon revenge.

A revenge so deceitful, so artful, yet so involved, that in the end, it was both magnificent and destructive to his own health. In short, he resolved to be recorded in every data file in the Library, and to that end, he had visited the CCC once a month since to verify the results and make new assaults.

"It all started," he explained, "with Copyright. I sent an application, fee and one copy of an outline of the revision of my book into the Copyright Office for registration. From the first, my application was entered into COINS. My first file! Naturally, I had made an error on my application. They thought, however, they could get around that by calling me and asking for my permission to emend the application. Naturally, I acted the part of the angry taxpayer and instructed them to write me."

Upon my asking why, he explained that all correspondence had to be entered into the Copyright Office's internal Correspondence Management System (CMS, God help me!) and a permanent file created ... Number 2.

Of course, once his claim was registered, his work was sent to copyright cataloguing and entered into its online monograph file -- COHM.

"So far for copyright?" I concluded.

"Oh no ... I chose to legally register a document of transfer of all right, to my cat, as it turns out. But they don't know that. No; that document now appears in COHM."

My head began to ache when I realized that my own Vergil was leading me through the many rings of the modern-day abyss.

"Next, I sent galleys of my revision to the Cataloging In Publication Office for cataloguing in advance of publication. They rapidly sent me the record and entered my work on line. You may recognize the tag on the record: Unverified CIP Record."

"When will it be verified?" I asked naively.

"I suppose if I intended to publish the work, once I had satisfied my end of the bargain and had sent them a copy. As I do not intend to do so, 'never' is your answer."

"So now we have a SCORPIO and MUMS CIP record," I reflected wearily.

"Yes; and since I have changed my name from the first edition, a change has now been duly made on the Name Authority file in MUMS."

"File number ..."

"Seven," he answered with a bit too much fervour.

"Next, having made friends with the reference staff in the Main Reading Room and having secured their favour, I garnered a green request slip from one of them to request that the Library procure a copy of a variant form of my book from a fictitious publishing house. As a specialist in the field, I strongly recommended it. They had no choice but to pass it along to their Order Division."

"My dear man, to what purpose?"

"Why, I wanted the book to have a new cataloguing record entered through Descriptive Cataloging, of course."

I saw no "of course" about it. "And ...?"

"Not yet; I've seen other order records on APIF ..."

I did not bother to ask.

"... and I have been checking for at least five months now, but no "ordered" tag has appeared on the record; no priority has been established, not even a 5. I must redefine my plan."

At this point, my companion lapsed and began to appeal to himself. The coffee was gone; our cigarettes were out and we continued stychomytheically:

"What next?"

"BIBL."

"BIBL?"

"My article on the tactical subservience of Congress."

"Will it be used?"

"It is already LRS85-11111."

"And then?"

"NENUL! A revised Arabic version!"

"And then?" wondering if he were going to set his opus to music or even choreograph it.

"And then?"

"Somehow, some way ... GAO ... CG ...NRCM ..."

"An organization?"

"Of one!"

"Good God! When will you be done?"

"Never. Never. Never. Never. Never ..."

Levon Avdoyan
General Reading Rooms Division

COMPUTERS AND COPYRIGHT: THE AUTOMATION OF INTELLECTUAL PROPERTY RECORDS

Their fingers cautiously type out letters. They waver before pressing ENTER. Until the system processes the command, they frown in anticipation. When the automated record appears on the screen, their faces light up in relief. From time to time someone pulls out a camera and takes a photograph of the bright green display.

The above drama, played out many times a day throughout the Library of Congress, has a special feeling in the reading room of the Copyright Office. To these files come members of the public, who are eager to see the technological display that confirms their creativity. In contrast to the Library of Congress Computerized Catalog and other automated files, the Copyright Office Automated Catalog is often a more personal record of the hopes and expectations of the American public. Many budding playwrights, aspiring composers, and hopeful novelists, who do not as yet see their creative endeavors in general circulation still derive a measure of satisfaction from being able to record their claims to copyright. For some, the appearance of their names and works in automated format may be as far as they will go in their field, but they have the copyright law to help bring them to that point. This is due to the more-liberal-then-ever provisions of the law itself.

Changes in the Law

Under the law of 1909, the only unpublished works able to be registered were music, drama and graphic arts. When the 1976 law became effective on January 1, 1978, unpublished "nondramatic literary works" also were granted formal registration. The floodgates were opened for early manuscript versions of novels and even single chapters of projected books. Academic papers and bound volumes of poetry found their way into the Office and into the automated record. All of these works, one copy of each having been deposited in compliance with the regulations, form the core of the copyright deposits collection stored in Landover, Maryland. They are kept in perpetuity and, in time, may be the unique copies of the works; hence, they have value both as objects and as parts of contemporary creative output.

In contrast, the published works which are deposited are first reviewed by various LC selection officers for inclusion in either the general or specialized collections. Those not selected remain in copyright storage for only five years (ten if they are graphic works), after which they are re-offered to LC before proceeding to Exchange & Gift Division.

No catalog cards are being produced as a hard-copy back-up file for any works other than serials. Furthermore, since the unpublished works are not immediately available as are most of the LC collections, and because the published works are scattered throughout the Library, the automated records are the sole means of access for copyright information from 1978 onward. These records exist in two subsystems of SCORPIO, the Copyright Office History Monographs file (COHM) for all works other than serials, and the Copyright Office History Documents file (COHD). Research in the files reflects the fact that the Copyright Office, by administering the law, is a channel for both physical objects and the abstract claims to copyright.

In-person Reference Assistance

On any given day, research in COHM and COHD involves various types of requests, handled by either the staff of the Reference and Bibliography Section or members of the public themselves. The most common problem is The Lost Copyright Certificate. Fires, floods and thefts seem to plague the writers of songs and first drafts of plays. If registration has been effected, however, the information can be found under name of author or claimant and title. For a fee, a certified copy of the original application then can be provided. This is, thus, a restitution to the patron of his or her prima facie evidence of the claim to copyright. If the material itself has been lost or destroyed, the deposit copy serves as the master from which a replacement is made (for a further fee). COHM is also useful in locating addresses of firms or individuals. Since these may not appear in any other catalog or reference source, the value of the copyright record becomes apparent.

The more frustrating business of copyright negotiations--contracts, verbal agreements and the like, all of which are not handled in the Office--is reflected in the "holes" in the record. For example, a songwriter may come to the files to confirm the registered claim to a composition which he or she handed over to a music publisher some time before. When no record appears under the name of the music publisher, the writer's name or pseudonym, or even the title of the song, the bibliographer needs to call up diplomatic skills to explain why the work was not registered: negligence by the publisher, unanswered Copyright Office correspondence, lost material, or a computer glitch. An in-process or correspondence search may help to locate the song, or in the worst case establish that there was never a receipt of it in the Office. Although the regulations are liberal enough that registration still may be effected, worries of threat and duplicity surrounding the rights to a creative effort necessarily color reference assistance. This highly personal investment in the material results in feelings very different from the inability to locate a magazine article or receiving a call slip marked "Not On Shelf."

The reference work in the Copyright Office often deals more with the intellectual property than literal objects, thereby distinguishing it from research in other LC catalogs. A reader using LCCC, MUMS or the Congressional files is generally in pursuit of a monograph, article or bill. In searching through COHM, however, the reader may be satisfied to have extracted from it the ideas discovered: whether a certain work was registered or not, who the claimant was, what was the effective date of registration, and so on. Of course, the hard copy is there to document this information, but often the discovery of "the right to make copies" is sufficient for the researcher.

This abstract quality is enhanced when the reader searches the COHD file, which is the record of documents filed in the Office since 1978. These documents, recorded by interested parties, are instruments of transfer, catalog sales, abandonment of copyright, mergers and similar transactions which affect the history of a particular claim to copyright. The documents themselves exist in microform copy in the reading room, although the researcher does not need to refer to them if, for example, getting the name of the most recent claimant is sufficient for his or her purposes. Thus, this file too can serve as a self-contained compendium of ideas, rather than an index to some physical object.

Both COHM and COHD have had an impact on the staff of the Information and Reference Division of the Copyright Office by adding to the duties of the copyright bibliographers. As the investigators and interpreters of the automated systems, they first have had to master the technology, where before they abstracted and coordinated information from catalog cards alone. A new duty has also evolved in the form of rotational reference assistance; the bibliographers now instruct the patrons in the use of the system, often the patron's first hands-on experience. Finally, these same staff members serve other LC staff, most often from Performing Arts and Prints and Photographs divisions, who come to hunt up the unique information that may exist only in copyright records.

Eric Zengota
Copyright Office

LOCIS-LEARNERS AND LOTOS-EATERS

A neophyte LOCIS-user (not to be confused with Tennyson's lotos-eaters, please) can choose one of three ways to learn the system. The General Reading Rooms Division (GRR) offers class instruction, self-instruction through manuals or the TEACH program, and individual tutoring from a reference librarian. This article describes the last method, although I will not hide from you, dear reader, the sad fact that some neophytes are so neo they could benefit from all three, seriatim. However.

Since there are approximately forty librarians who share teaching duties at the Computer Catalog Center (CCC), there are at least forty different methods of teaching. And, to further complicate this article, how one teaches depends to some extent on the type of reader one is teaching. In the interest of brevity and clarity, then, what follows is a highly idiosyncratic account of the types of users I've encountered over the years and the ways in which I teach them, with sample dialogues.

The overeager underachievers: so anxious to get some "hands on" experience that they anticipate your instructions, finish your sentences, and consequently don't listen to a word you say.

Me: Type "b," which stands for browse, leave a space, then type your sub...
They: Right, yeah, I entered it already.
Me: But you didn't tell the computer what to look for, so we'll start again from "b," space, put in your subject heading that we found...
They: Why does it take so long to learn?

The sneaky beepers: just can't keep that cursor to the right of the stationary blip, don't understand that the beeping is a warning to cease and desist, and after driving everyone demented with the noise, they refuse to admit it when you ask, "Who's beeping, please?"

Me: Who's beeping, please?
They: (in chorus) Not me.

The computerphobes: identifiable by their dragging footsteps, trembling hands, and constant cries of "I'll never learn--failed math in school."

Me: Take a deep breath and relax. You can't hurt the computer and it can't hurt you.
They: moan...

The computer mavens: related to the overeager underachievers but much easier to teach. They know enough about computers not to be overawed by them and to realized that each system has its own quirks; they listen intelligently to your voice-over as they follow the manual.

They: I type "bgns lccc," enter, and wait.
Me: That's right.
They: Now I type "b" and my author, last name first.
Me: That's right.

The tabulae rasae: as the name implies, without any knowledge of computers, but open to learning.

Me: Have you used the system before?
They: Never used a computer before, but I'm willing to learn.

And finally,

The lotos-eaters: the dreamers who believe that computers absolve mankind from all earthly labors. They type in their family name and expect their genealogy to appear, illustrated with their family tree, or they enter the title of the book they've been assigned to read, and expect a neat precis and several reviews to flash onto the screen.

Me: This is essentially a computerized card catalog, offering bibliographical information only.
They: Well, what's the answer to my question?

Although reader response to LOCIS is as diverse as the fanciful categories I've sorted them into, there are certain teaching strategies and techniques that can be used with all LOCIS-learners. First, it's important to establish their purpose and whether they need to learn the computer. For example, people on a brief or casual visit or in a great hurry are quite happy to let me find the titles they want. While we can't do extended searching, quick lookups by the librarians are much more efficient than teaching something that can be used only at LC. Second, if the readers do their own searching, I work with them to establish the correct subject headings; this often entails explaining what sa, x, and xx mean, what subdivisions are, and other tricks of the library trade. It's very satisfying to teach the rudiments of the "red books," since this knowledge is transferable to all libraries using the LC classification scheme.

Third, whenever possible, I sit next to the readers rather than looming over them in a teacherly fashion; besides putting them at ease, sitting allows me to see their reactions and sometimes anticipate problems before they hit the "enter" key. Fourth, and most important, I repeat to myself at regular intervals: "Patience, patience."

These are the commonalities; the differences in my approaches to the various types of LOCIS-learners are really differences of tone. The overeager underachievers and the sneaky beepers respond well to a firm and authoritative voice, rising in volume as the noise level rises, but remaining calm. The computerphobes must be jollied along, with constant positive reinforcement.

The mavens and the tabulae rasae can usually be treated quite straightforwardly; since they are relaxed about using the terminals, the hardware doesn't form a barrier to communication between reader and librarian. With the lotos-eaters, all the skills mentioned above come into play--to wake them from their vision of effortless knowledge requires patience, calm, good humor, firmness, and yet more patience.

Fortunately for those of us who teach LOCIS, since they are the hardest to reach, the last category of users is the rarest. My biggest failure, and also the funniest, arose from an encounter with a student lotos-eater. She was working on a class assignment; another student had been in the day before and had retrieved some items relevant to the topic. We found all but one of the references, but that last one remained unfindable no matter what search strategy I tried. When at last I confessed defeat, the student was philosophical about it. Patting my arm, she said consolingly, "Never mind. I'm sure she just took it out of the computer so that nobody else in the class could have it. She does things like that all the time." And with that, she drifted away.

Judith Farley
General Reading Rooms Division

TRAINING BY THE NUMBERS

To the roster of large numbers associated with LC--its collection of 80 million items, including 20 million books and pamphlets, its card catalogs with 90 million cards, its cataloging in 460 languages--add one more: approximately 1,000 people each week come to the Computer Catalog Center in the Main Reading Room to find recent books, periodical articles, or legislation on topics of interest. Over half of these readers are new or infrequent users of the online systems; about 10 percent are long-time researchers.

The Computer Catalog Center

When the Computer Catalog Center (CCC) opened in 1977 with six terminals, one reference librarian could provide assistance to users one at a time. In 1981, the online systems became more important to researchers as the card catalog was closed. That same year the CCC expanded to eighteen terminals, with two librarians attempting to respond to users' needs. Librarians often considered their time in the Computer Catalog Center onerous duty, joking tiredly that they needed the patience of Job and the arms of Shiva to help everyone who requested assistance. Although enhancements in the systems made searching more elegant, little was done to make it easier. Clearly, a way to train more than one reader at a time was needed.

The General Reading Rooms Division began to investigate group training early in 1983. Unfortunately, both the user survey by Sarah Pritchard ("Scorpio: a Study of Public Users of the Library of Congress Information System". (January, 1981) Available on ERIC, ED198-801) and the 1982 survey of online public catalogs, sponsored by the Council on Library Resources (Joseph R. Matthew, Gary S. Lawrence, Douglas K. Ferguson, eds., Using Online Catalogs: A Nationwide Survey (New York, Neal-Schuman Publishers, 1983)), reported that users doubted the value of classroom instruction, naturally preferring other, more personal approaches. When the Division looked at automation training programs in the Library, however, one very successful example of classes stood out--the instruction provided by the Office of Automated Information Services (AIS) of the Congressional Research Service.

AIS began its training efforts in extremely inauspicious circumstances. Congressional offices would call and make an appointment with a trainer, who went to the office to teach staff. The normal business of the office would continue. Staff could be pulled away from training to perform other duties. Visitors needed greeting; phones needed answering. Obviously, training in these surroundings was less than satisfactory. In 1978, AIS offered its first formal classes, six hours of hands-on instruction spread over several days. As AIS trainers gained experience, they shortened the classes to four hours in one or two days. AIS currently trains approximately 1,000 people each year in all aspects of automated information retrieval through these classes. In addition, the computer-assisted instruction provided by the PLATO system has met the continuing need for individual training.

The General Reading Rooms Division, encouraged by the success of AIS's classroom efforts, offered instruction to researchers in groups of three or four in early 1983. Shortly afterward, a new facility, the Automation Orientation Center (AOC), opened in the Madison Building. Equipped with a device which allowed online searches to be projected onto a screen, the auditorium of the AOC provided the first opportunity for teaching larger groups of readers using "live" searches. While this was an improvement over earlier methods, which were limited either to very small groups or to simulated searching, the essential connection between user and terminal was still lacking.

Then, in June of 1983; sixteen terminals were added to another part of the Automation Orientation Center, making hands-on instruction available to public users for the first time. Since then, more than 2,000 students have attended more than 300 classes. In spite of the user surveys' predictions, readers' reactions have been very positive from the beginning.

CRS Training

The Congressional Research Service assists Members of Congress and their staffs, and the training offered by AIS reflects this specialized clientele. AIS concentrates on the legislative and current awareness files, two parts of the SCORPIO system. The trainers pay less attention to other SCORPIO files or to MUMS because their users generally do not need them. As a result of this fairly specific focus, AIS has been able to develop excellent teaching documentation, in the form of user-instruction manuals and the PLATO system based on those manuals. Also, since Congressional staffs tend to remain fairly constant, CRS's users have become more sophisticated over the years and have requested the inclusion of more complex features in their files. This demand, in turn, has drawn ever more responsive training and documentation from AIS. Recently, AIS has been able to offer Congressional users individual assistance with particular searches. Ironically, this new service, one-on-one guidance, was precisely the situation GRR was attempting to minimize by opening its classes.

GRR Training

The general reading rooms, on the other hand, serve government agencies, the scholarly community, and the public. The information needs of these groups are much broader than those of CRS's clients, and they tend to be more traditional, that is, they focus on the book and periodical resources of the Library. In response, GRR offers a series of training sessions, beginning and advanced, in both the MUMS and SCORPIO systems. This breadth of scope has resulted in outstanding summary documentation, but not in specific user instruction aids. In addition, the number and variety of such users seems to require greater attention to the basic techniques of searching the automated files, often to the exclusion of the more powerful and glamorous features.

AIS also trains other CRS staff members, not only in the use of LC's automated system, but also on the commercial databases. Clearly, such training contributes to the important mission of CRS by enhancing the skills of employees and making them better, more effective researchers. When GRR began its classes, however, transfer assumed that their goal was to acquaint users of the Library with the ways of automated searching. The training of GRR's own staff was seen as a beneficial by-product of this basic instruction. When all of the first classes were filled by LC staff members, trainers were both surprised and chagrined. Classroom space was suddenly unavailable to the users for whom the training had been established. A stated limit to the number of staff members allowed in any class resolved this problem, but statistics show that over one quarter of the users trained by GRR are still LC employees, most of them from other Research Services Department divisions. In spite of the fact that this training was designed for public users, GRR's classes are obviously filling a void in LC's training of staff. The degree to which other areas of LC are responsible for training their own staffs, not to mention their own specialized readers, remains undecided.

Future of Group Training

What is the future of group training for users of the Library? Such teaching is certainly labor-intensive; AIS estimated that is devotes 400 to 500 hours per year to training, with GRR averaging between 350 and 400 hours. To this time must be added time for the preparation and maintenance of documentation. Clearly, these training efforts require a serious commitment on the part of the parent departments. Is such a commitment prudent?

A recent unpublished study prepared for the Council on Library Resources by Brian Nielsen, Betsy Baker, and Beth Sandore and entitled "Educating the Online Catalog User: a Model for Instructional Development and Evaluation", indicates that the evaluation of training

classes is a difficult matter at best. Written tests do not accurately reflect user behavior in front of a terminal, while the analysis of transaction logs (if meaningful logs can even be kept) is a cumbersome and expensive process. Neither AIS nor GRR have incontrovertible proof of the effectiveness of their training programs. Nevertheless, the demand for training continues to increase. Upcoming changes designed to provide online assistance, to make the systems more "user friendly," will certainly help users proceed more smoothly through their searches. Budget and staff cutbacks may change the amount and perhaps the quality of group training that is available to Congress and the public, but some sort of group instruction is likely to continue simply because the alternatives--no instruction or teaching one at a time--are now unworkable.

Librarians in both AIS and GRR feel that users are more confident and more efficient searchers. Moreover, the trainers themselves have become more aware of the problems faced by users of the systems and have learned ingenious ways to resolve those difficulties at the same time that they act as articulate advocates for system improvements. Although the need for the individual attention given by one librarian to one researcher will never disappear, group training undoubtedly provides a vital service to the many users of the automated resources of the Library.

Margaret Morrison
University of Central Arkansas
(formerly General Reading Rooms Division)

THE NEW REFERENCE LIBRARIAN

Automation has had a tremendous impact on the day-to-day activities of the reference librarian at the Library of Congress. Indeed, new technology has led to the creation of a "new" reference librarian-- one who is computer-conscious and makes use of a variety of automated resources as a part of everyday reference service. This paper will present a composite profile of the new reference librarian, based on the education and training, daily automation activities on the job, and continuing professional development of staff members who provide public reference service at the Library of Congress.

Education and Training

Since the 1970's, library schools have begun to emphasize information science courses, in addition to courses on traditional librarianship. Many graduate schools of library science are becoming graduate schools of library and information science not only through name changes, but also through real changes in curriculum content. Students can concentrate or specialize in information science by choosing electives designed to train information professionals.

What started as a few courses dealing with automation of standard library functions--technical services and circulation, for example-- has quickly multiplied to courses and programs covering the use of new technologies in all library functions. Today a librarian who has just graduated from library school will have studied reference with a new focus on automation.

In a 1982 survey of graduate library school catalogs, library consultant Howard Fosdick grouped the available courses into five categories[1]:

Library Automation: The use of computers to automate traditional library functions such as cataloging, circulation, and serials check-in.

Information Storage and Retrieval: The theoretical and practical aspects of information science.

Systems Analysis: The use of statistical methods to measure and evaluate library operations and services.

Interactive Computer Systems: Information storage and retrieval of online search systems.

Programming: Solving library problems through computer applications.

Fosdick found that "almost all the schools teach one or more courses in information storage and retrieval, while nearly 75 percent of the schools teach courses in library automation, systems analysis, and interactive computer systems. Almost 40 percent of the schools offer one or more programming courses."[2]

In addition to special courses devoted to information science, most library schools integrate automation into traditional library courses. Many of the courses on reference services include instruction on the use of online retrieval systems such as DIALOG, BRS, SDC, and OCLC.[3] Thus, reference librarians at LC who are recent library school graduates have most likely used one or more search systems and easily can adapt to the Library's own SCORPIO and MUMS systems in a relatively short time period.

Continuing Education and Professional Development

A variety of seminars, training courses, and update sessions are available for the reference librarian to keep up with the ever-increasing number of online systems. Many of the commercial database vendors such as DIALOG and NEXIS provide basic and special instruction sessions for the use of their systems. At the Library of Congress, the Federal Library and Information Center Committee offers courses on searching the national utilities such as OCLC and RLIN. The General Reading Rooms Division (GRR) regularly provides beginning and advanced training sessions for MUMS and SCORPIO. Reference librarians in GRR also organize workshops and refresher courses for staff members whenever the system undergoes a new release. In this way, key trainers are able to keep all of the reference librarians and specialists informed of the new system functions and search techniques.

In addition to the various training sessions, the new reference librarian depends on the professional literature to keep abreast of the latest automation developments. American Libraries, Library Journal,

Wilson Library Bulletin, and Reference Quarterly are just a few of the many professional journals which have regular columns devoted to automation and online systems. Other journals, such as Database, Online, Information Today, and Chronolog have as their entire focus specific areas of online information and retrieval systems. Locally, the General Reading Rooms Division produces a newsletter, XMIT ONLY, especially for reference librarians at the Library of Congress. XMIT addresses automation issues specific to the Library of Congress Information System (LOCIS) and occasionally has articles about other commercial databases. Additionally, the LCPA Newsletter regularly provides the professional librarian with a column on microcomputers.

Professional organizations like the American Library Association (ALA) also offer reference librarians a chance to learn more about automation in two ways: through the programs of the annual or midwinter conferences which focus on topics of online information retrieval, or through various committees which deal with automation issues. One recent example of a valuable conference program was presented at the 1985 Annual ALA Conference in Chicago. The Machine-Assisted Reference Section (MARS) of the Reference and Adult Services Division (RASD) sponsored a program on end-user systems. The participants discussed online systems operated directly by patrons, something very familiar to librarians at the Library of Congress.

MARS also has five standing committees covering the following topics: nonbibliographic databases and data files, education and training of search analysts, use of machine-assisted reference services in public libraries, direct patron access to computer-based reference systems, and measurement and evaluation of services. These committees produce publications, standards, and guidelines which are immediately relevant to reference work at LC. Unfortunately, many of these useful resources are unintentionally overlooked due to the demanding workload and tremendous amount of other literature available. Nevertheless, a handful of LC reference librarians traditionally have been active on MARS committees, a fact which demonstrates their commitment to professional development, as well as their general interest in the recent trends and future uses of automation in reference service.

Daily Automated Reference Activities

To appreciate the full impact of automation at the Library of Congress, simply look at the everyday activities of a general reference librarian. Reference librarians use LOCIS on a daily, if not hourly, basis. They tend to be among the most skilled searchers in the Library, since they must be able to use and explain all of LC's online systems and files equally well. No portion of LOCIS is out of scope when it comes to reader requests. Librarians must not only provide information on the strengths of the online systems, but they also must be prepared to explain the limitations of the system to readers. Many people approach the computer with the assumption that everything can be located online. Reference librarians must constantly put the system within a larger context and refer readers to other indexes and catalogs. The fact remains that, as good as the online systems are, they provide access to only a fraction of LC's holdings.

Each reading room in the Library is equipped with at least one terminal to provide readers with access to the SCORPIO and MUMS systems. In addition, the Computer Catalog Center (CCC), adjacent to the Main Reading Room, contains 17 terminals and is staffed by two librarians. After the renovation, there will be another CCC in the Adams Building between the Science and Social Science Reading Rooms and a greatly expanded center in the Main Reading Room. At the present time, the CCC is staffed by librarians from the General Reference Directorate of the Research Services Department and some catalogers from the Descriptive and Shared Cataloging Divisions, who are participating in an experimental program through which they can work with the users of catalog records. In the future, these librarians should be joined by librarians from Area Studies and Special Collections so that readers can obtain the best service possible in the areas of the Library with the highest concentration of public terminals. This will become even more important as new files such as manuscripts and visual materials are added to LOCIS. Librarians from Area Studies and Special Collections will increasingly need more and better training on using LOCIS. To satisfy this need, there is no better training than the experience of working with the public at the CCC. In the past few years, a new option for learning the LC computer systems has become available to readers-- they can attend group sessions to learn how to use SCORPIO and MUMS. In addition to their other duties, reference librarians in the General Reading Rooms Division serve as instructors for these sessions.

Behind the scenes, several reference librarians take the opportunity to participate in automation planning together with staff members from all departments of the Library. Traditionally, the Congressional Research Service (CRS) and Processing Services have determined much of the direction and priorities for automation projects at the Library. Research Services has needed a stronger voice in automation planning, and, as a step in this direction, reference librarians from Research Services now join staff members from the other departments to take an active role in developing new LOCIS applications. Reference staff also send representatives to various committees of the Retrieval Advisory Group (RAG), where they play an important part in designing new features, indexing, and displays for files in LOCIS and recommend priorities for future projects.

The Reference Librarian in the Future

This profile of a reference librarian would not be complete without a brief discussion about some possibilities for changes in the future.

One area in which the Library of Congress lags behind most other libraries is in providing access to commercial databases. At the present time, there is no clear policy for completing online searches in commercially available online systems for our readers. The problem of fees and cost recovery seems to be the reason for the delay in implementing such a service at the Library. Reference librarians do have access to these systems and can use them for readers at their discretion, but the fact remains that, except for some of the bibliographic utilities (OCLC and RLIN), commercial databases are not now generally used in public reference service by most of the staff. What is needed from management is a policy for online searching and a commitment to try some approaches to providing

this type of service. At the very least, the various reading rooms could develop policies and implement ready-reference online searching at the reference desk. It would be relatively easy to place dial-up terminals at reference stations for use in quick reference checks of commercial databases and bibliographic utilities.

Recent technology has provided a new option for readers to search commercial databases for themselves. End-user searching of various online files has been made easier through front-ends and gateways. These are software packages and intermediary computers that connect the user with particular online systems. Some provide menus or simplified translations of search commands so that first time users can use the systems for themselves. Others help the user select the relevant databases and set up the search strategy, store phone numbers, and automatically log on and run the search. Many front-ends and gateways are already on the market and available to libraries, and their number is growing almost daily.[4]

On the other hand, one area in which LC is pioneering is optical disk technology. The Optical Disk Pilot Project is well underway: terminals have been installed in major reading rooms, have been tested and evaluated by staff members, and the public now has access to the Optical Disk Information System. Readers are able to move from a bibliographic citation to the full text of a document at the terminal. Reference librarians have a major role in providing assistance and training on the optical disk system.

What are other possibilities for the future of reference librarians at the Library of Congress? As with other areas around the Library, microcomputers will most likely make their way into the everyday work of reference staff. Micros could be used to produce reading room staff schedules, to manipulate and provide reports on reference statistics, and to create databases of common reference questions, reference book locations, or other locally-produced files. These same microcomputers could be used by readers to access commercial database systems via the front-ends and gateways discussed above. In addition, some of the machine-readable files and software now coming into the Library through the Copyright Office and the Cataloging in Publication program might finally be made available in an "electroform" reading room in the not too distant future.

Will the reference librarian at LC be able to deal with all areas of automation? Can staff members even hope to keep up with all of the available literature or learn all of the command languages and search features of all online systems? Given the fact that reference librarians must continue to learn and review standard reference sources in all fields, develop specialties in assigned subject areas, and spend most of their day on the desk, the answer to the above questions must be "no." To attempt even to accomplish universal staff knowledge of automation, management must help by providing more training opportunities and more staff so that librarians can have time away from the desk to develop expertise in automation.

A more likely and more manageable scenario, however, would be the emergence of staff members who are specially trained in a variety of automation technologies. Thus, general reference librarians could develop the necessary skill in using LOCIS, and the automation specialists could provide service on the ever growing number of information storage and retrieval devices and systems, preferably in a well-equipped reading room or automation center.

Whatever the Library decides to do, two things are certain: now is the time to start planning for future developments in automation, and the new reference librarian will continue to make use of an increasing number of automated resources to provide reference service at the Library of Congress.

Louis Drummond
General Reading Rooms Division

1. Howard Fosdick, "Trends in Information Science Education," Special Libraries 75 (October 1984): 293.
2. Fosdick, 293-294.
3. Fosdick, 295.
4. For a simple description and some examples of front-ends and gateways, see: Martin Kesselman, "Online Update," Wilson Library Bulletin 58 (December 1984): 272-273.

THE OPTICAL DISK PRINT PILOT PROGRAM AT THE LIBRARY OF CONGRESS

"There are no limits to the imagination when not charged with the task of implementation."

"How does a project get delayed for a year? One day at a time..."

The above quips are probably familiar to those of you who keep up with the latest in office bulletin board witticisms. As civil servants, we are perhaps most vulnerable to allegations of "government waste" in this era of over-priced coffee pots. As staff of the Library of Congress, we are perhaps most keenly aware of the fiscal scrutiny of our boss--the Congress itself--since that legislative body supports the projects which, no matter how well-intended, may go awry in the long journey from planning to implementation. The fact that the Optical Disk Pilot Program at the Library of Congress was begun and has continued with overall Congressional approval perhaps makes a positive statement not only about the promise of this technology, but also about the way the program has been organized since its inception. In fact, the saga of how the Library of Congress has proceeded internally to test optical disk storage may be as dramatic as that of technology moving toward a level of maturity which may someday lead us to the "paperless library."

Think Tank Formed

In March 1982, William Welsh, Deputy Librarian of Congress, established an Ad Hoc Committee (affectionately known as the "Think Tank") to "study the impact of Optical Disk technology on the Library of Congress." This inter-departmental group met frequently thereafter and in December 1982 issued several substantive progress reports. These reports considered the impact of optical disk storage in the context of technologies already implemented in the Library of Congress since 1946, as well as the likelihood of an even more dense storage medium coming down the pike. The Think Tank groups outlined five stages generally involved in introducing new technology into the Library: (1) concept, (2) experiment, (3) pilot application, (4) early production, (5) mature use. They projected 1984 as the date for beginning the experiment in the new technology, followed closely by the beginning of a pilot program. The Committee cited "high density storage" as the overriding requirement for selecting optical disk technology, and listed preservation, service, and access (including linkage with existing systems) as the primary reasons for applying the technology at the Library of Congress. Perhaps the most astute recommendation made by the Committee was that "overarching coordination which can cross the departmental structure will be needed and can only be effectively provided by some single management assignment."

Matrix Management Chosen

On February 9, 1983, a Special Announcement was issued from the Office of the Librarian outlining a Three-Year Management Plan for the Optical Disk Pilot Program, to include both the Print and Non-Print Collections. It was clearly stated in this announcement that the objective of the program was "to evaluate the use of optical disk technology for information preservation and management to determine if such a system could be put to wider use in the future." Next began the task of identifying staff throughout the Library whose talents and skills in a wide range of areas would be needed to make the project a success. Joseph Price, chief of the Science and Technology Division, was named Director of Projects to serve as the top line manager of the program. Peter Sparks, Director for Preservation, was given an advisory role on the operation of the management plan. His first suggestion was to introduce the concept of "matrix management" and to proceed to apply it to the pilot program. Since the project was clearly evolving as an inter-departmental effort, with over 75 people from at least 12 Library offices and divisions ultimately assigned to various projects, some standard operating procedures needed to be developed for managing the matrix. To complicate matters, each of the 75 people would continue to perform the regular duties of their official LC positions while taking on a variety of tasks for the Optical Disk program. The usual "chain of command" which was necessary to the execution of duties in their official positions would not be used within the project. It would not always be clear to whom a particular problem on the project should be referred, and more often than not, problems would be solved jointly, by committee, with knowledge and expertise creating its own hierarchy. Clearly, members of the matrix would have to possess a high tolerance for ambiguity, relying on their own instincts and creativity for problem solving. Again, seen in the context of government bureaucracy, the successful use of matrix management on the project is no less miraculous than a technology which promises to capture one million images in a standard-sized juke box occupying 15 square feet of space.

To simplify matters, and to coordinate basic activities, managers were named to head each project. Projects which comprised the print pilot program were Design Print Pilot Experiment; Print Contract Monitoring; Print Installation and Acceptance Testing; Print Pilot Operation; Design Disk Test Facility, and Future Issues.

Other Developments

At about this time, late in 1983, the Library entered into a contractual agreement with Integrated Automation of Alameda, California. IA would provide the custom-built equipment and the Library's Automated Systems Office would develop the accompanying software. The 1.7 million dollars to be spent on the hardware would be absorbed by ASO and the various departments would contribute personnel resources. As already discussed, the majority of the staff would already be on board and would now be performing collateral duties, thus precluding the need for much additional hiring. Down the road, staff would be hired on an indefinite basis (in most cases with duties extending beyond the Optical Disk Program) to actually create the data base (i.e. perform input scanning) when the project became operational. Was it no wonder that the Congress reacted favorably to the project, given these fiscal benefits which the matrix management approach afforded?

As if this was not enough of a selling point, consider the promise of the technology for solving a growing space problem which, if unheeded, might mean the need for a fourth Library building on Capitol Hill, as 7,000 new items are accessioned each day. Consider the improved service to the Members of Congress and their staffs in the form of rapid document delivery via terminals. As icing on the cake, the Library would be

the first organization to test the technology with the goal of "writing" images to and "reading" images from optical digital disks.

Late in 1983, other major developments were occurring. At this time, the Print Design Team began the task of developing a blue print for the pilot program with Ellen Hahn, chief of the General Reading Rooms, as project manager. The team was divided into five critical working groups to explore issues identified in the report of the Think Tank. They were as follows: (1) Acquisitions/Copyright, (2) Bibliographic Access, (3) Document Preparation and Input, (4) System Use, (5) Preservation. These groups rolled up their sleeves and attacked each issue at a level of detail which can best be appreciated in hindsight if one stops to compare later implementation with this original blue print.

Copyright Considerations

Though each of these groups tackled equally important facets of the pilot program, the Acquisitions/Copyright group faced perhaps the greatest challenge, as they had to work within the confines of the Copyright Law, which protects public performance or reproduction of a work without the permission of the copyright owner. However, like any law, it is still subject to interpretation, particularly if one centers upon the "fair use" clause. The group worked closely with Copyright Office staff to consider if public display on a terminal constitutes public performance and if printing multiple copies from a terminal could be deemed infringement. The issue of the impact of new technologies on the Copyright Law is large and will not be dealt with here. Suffice it to say that the group aggressively cultivated the support of the publishers, making them aware of the Library's desire merely to test the technology. Eventually, permission was granted to scan 72 journals (1983-1985), and an Advisory Group was established for continued dialogue between LC and the copyright community (persons concerned about the safeguarding of "intellectual property.")

The year 1984 was pivotal for the pilot program. The hardware consisted of a paper scanner designed to handle 8 1/2 by 11 or 11 by 14 originals scanned at 300 lines per inch, a microfiche scanner for 24x standard 98-frame fiche, two work stations on which to perform the tasks of input scanning and quality review, six public user terminals (to be placed in the various reading rooms), a juke box holding up to 100 disks, two convenience printers (Xerox 5700), and one high-speed printer (Xerox 5700) for off-line batch printing. The hardware also included various internal mechanisms affording one a whole new vocabulary unique to the digital industry: magnetic disk drive buffers, video system controller, disk drive unit, terminal cluster controller, and compander. Basil Manns, senior systems engineer in ASO, was designated project manager responsible for monitoring the contract with Integrated Automation, overseeing the installation and acceptance testing of the aforementioned hardware, and handling the linkage between ASO software and IA hardware--a bicoastal endeavor. After several months of initial testing in the fall of 1984, the hardware was accepted provisionally and the pilot program became "operational."

The Print Operations Team had been busy picking up where the Print Design Team left off and began planning for the realities of implementation. The Team, which still continues to meet to develop procedures and resolve operational problems, consists of about twenty coordinators with various responsibilities related to both input scanning and retrieval. Also part of the Team are the custodial division liaisons and public service representatives interested in how the material is put onto the disks and how it can best be retrieved by users. The Team is headed by Tamara Swora, Assistant Preservation Microfilming Officer, who serves as Print Pilot Operations Manager, and Jeff Griffith, Specialist in Automated Information Services (CRS) as Assistant Operations Manager. Input Scanning, otherwise known as creation of the data base, began late in the fall of 1984. Shortly before this time, I came on board as Operations Coordinator, the only person other than a clerical assistant, who was hired on a full-time basis to manage the day-to-day operation. The Operations Staff consists of seventeen members of the Preservation Microfilming Office. In addition to their regular job of preparing records for materials to be microfilmed by the Library's Photoduplication Service, they would now be trained to operate the equipment. Three teams were organized and each month a new team rotates onto the project while the remaining teams perform their regular PMO duties. Staff working on the project each month are responsible for document preparation (with many parallels to this facet of micrographics), input scanning and quality review, ultimately only "writing" acceptable images to the disk. Often the unsung heroes of the project, the operations staff are in touch daily with the technical "glitches" which might not come to light if they did not work so closely with the system.

Phase One Nears Completion

To date we are nearing the completion of Phase I, which was dedicated to full hardware and software testing and scanning of the current events file (BIBL) created by staff in the Library Services Division of CRS. The Operations Team has worked closely with representatives from Library Services since they are most knowledgeable about the material and their advice has made a favorable impact on decisions made about input scanning. Approximately 2,000 articles (from the 72 copyright-permitted journals, plus those in the public domain) have been written to disk thus far. The public service representatives have trained LC reference Librarians to retrieve these images from the disks. Having completed further retrieval testing, the system has been made available to the public.

Plans are now underway for Phase II, in which operations staff will scan serials, manuscripts, maps, law material, sheet music, and other parts of the Library's collections. (Material to be scanned was recommended by the Preservation Policy Committee and the Print Design Team). Unlike BIBL, no machine readable records exist for this material, and therefore, a retrieval capability is currently being developed by staff in ASO.

As one might imagine, there has been a great deal of interest in the Library of Congress pilot program. Robert Zich, Director of the Planning Office, has served as project manager in charge of Public Information. Numerous requests for tours of the operation have been received by his office since the program's inception. The operations staff who work in the Optical Disk Operations Center (ODOC) in ASO are frequently called upon to demonstrate input scanning,

quality review, and writing to disk. It has been said that ODOC is an "international fish bowl." This not only describes the glass-enclosed environment, but the profile of the visitors that the Library has received.

There are several other projects remaining in the pilot program. Plans are underway to design the Disk Test Facility. Under the direction of the Preservation Office, the facility will test the durability of the digital disks, particularly for long-term preservation and achievability. William Nugent of ASO has been active on the Standards Project, focusing upon the identification, evaluation, and documentation of standards adopted by LC in its Optical Disk Program, in order to facilitate information interchange on optical storage media nationally and internationally.

Future Issues

Perhaps the most recent development on the program has been the organization of the Future Issues Team under the direction of Ellen Hahn. The group is gearing up to tackle such weighty problems as "what happens next?" That is, what must be considered in the event the pilot program evolves into a permanent part of the Library's operations? The pilot phase of a the program is scheduled to conclude late in 1986, at which time a final report will be issued. It should be apparent through this brief history of the program how much effort on the part of LC staff has gone into both the planning and implementation of the pilot, with well over 75 people involved over the past three years. We are optimistic about putting this new technology to wider use in the future, as it potentially can solve many of the Library's problems, including space, service, access, and preservation. In its infancy in 1982, the industry already has made dramatic improvements in its technology, as evidenced by the recent upgrading of the project hardware. The onus is now on the technology to live up to our expectations and on the Library to plan for further implementation.

Audrey Fischer
Preservation Office

THE NON-PRINT PROJECT OF THE OPTICAL DISK PILOT PROGRAM

For the moment, forget what you have heard about the Optical Disk Pilot Program--especially things like gigadiscs and jukeboxes, digitization and the ODOC. You may think that is what the Program is all about. Wrong. The Optical Disk Pilot Program consists of two projects: the print and the non-print (i.e., pictorial). And, although both projects are exploring the questions of how optical disks help preserve library materials and help improve researchers' abilities to use library collections, the projects have progressed in entirely different ways.

Differences

The Non-Print Project is much smaller in scale (and cost) than the Print Project--only a handful of people have been directly and continuously involved in it, and only a modest number of disks have been made. In addition, disk production and the resulting disks are completely different from those being made in the Print Project, the schedule has been totally different, and off-the-shelf equipment and currently available technology are being used. Just like the Print Project, the technical aspects of planning and making disks have presented an enormous challenge, but most Non-Print Project time and effort have been devoted to the intellectual challenge of access and retrieval.

Beginnings

In December 1982, the Prints and Photographs Division (P&P) and the Motion Picture, Broadcasting and Recorded Sound Division (M/B/RS) found out that they would be participating in the Optical Disk Pilot Program. Many of us had little or no idea of what videodisks were, much less what they could do for us. Since the Library was using off-the-shelf equipment, the making of disks could occur immediately; indeed, Sony Corporation of America already had subcontracted with photographers to film collections for the videodisks beginning in January! The project was suddenly in motion, and for the last two-and-a-half years we have been frustrated and stimulated, discouraged and overjoyed by our leap into the twenty-first century. It has been an exciting experience.

The Disks

In the Non-Print Project, visual media have been put on analog laser videodisks and sound recordings on compact digital audio disks. Three videodisks contain still images: 13 collections (approximately 49,000 items) from P&P and approximately 90,000 motion picture publicity stills of the 1940's to the 1960's from M/B/RS. Three other videodisks include motion images from M/B/RS: seven films or segments of films with special color preservation problems; 19 titles from the turn-of-the-century paper print collection; and two CBS news broadcasts from the 1976 Bicentennial Fourth of July weekend. The compact digital audio disks offer two concerts recorded in the Library's Coolidge Auditorium. Since computer automation is being used only with P&P's still image disks, this article will confine itself to that portion of the Non-Print Project.

P&P's Collections

The Prints and Photographs Division has custody of some 12 million items: original photographs, negatives, fine prints, historical prints, posters, and artistic, documentary, and architectural drawings. They represent all periods and subjects. Researchers (now numbering more than 800 per month) attest to the fact that pictures are being used increasingly, not only as illustrations in books and for pure pleasure, but also as evidential documents to supplement and complement other primary research material in social, political, and cultural studies.

You must realize that P&P still operates with a totally manual control and access system (at least until Visual Materials Online is implemented). This is a considerable handicap when we are confronted with the high demand for our collections. Preservation, collections management, and security considerations oblige researchers to approach the material indirectly through card catalogs and the collective memory of the staff. Use statistics alone justify automation of this access.

Using Pictures in Research

But, an additional factor makes automation an incomplete solution: language ultimately lacks the words to describe pictures precisely and to interpret what they say; the images conjured up from verbal descriptions can be confirmed only by calling for the pictures themselves. Then, even a glance might suffice to prove them appropriate or not. Automation will result in more verbal records being available for the researcher, but will strain our desires to preserve and protect our collections even more.

Microforms of pictorial materials are somewhat disappointing, especially considering the cost and labor necessary to create them. They are awkward to handle and require various kinds of equipment for viewing. Image quality, at first usually quite good, deteriorates quickly as the microform is scratched and fingermarked from frequent use. Especially frustrating is the lack of rapid, random access.

Enter the videodisk. The analog laser videodisk offers the same preservation advantages of other microformats: it reduces the risk of loss, theft, and misfiling of original material; eliminates overhandling of fragile, fugitive media; guarantees an image for the researcher to consult even if the original is "not on shelf"; and allows for remote and compact storage of the originals in more stable temperature and humidity controlled environments. The videodisk has several other significant advantages: it is more durable and can be handled more easily; it is a very dense information storage medium for color and continuous tone material: up to 54,000 individual images can be recorded on one side of a disk; a two-sided disk can therefore contain over 100,000 items (in contrast, the representation of color and continuous tone is exorbitantly expensive in digital form and takes up an enormous amount of space); there is truly rapid and random access; an image can be displayed indefinitely ("freeze-frame") without damage to the disk or the image; both still and motion images can be combined in this one format; and disks can be linked interactively to cataloging data. Clearly, the videodisk meets the Optical Disk Pilot Program's goals for improving preservation and access in ways that other microforms cannot.

The Videodisk Experiment

Nearly 49,000 images from the Prints and Photographs Division were included in the videodisk experiment in order to represent many typical preservation and access problems. Complete collections were selected so that there would be a sufficient amount of related material for users to conduct real research. Several of these collections were not previously available to researchers because of their fragile condition, difficulty in handling, or lack of cataloging.

The Sony Corporation of America was contracted to make the 12-inch analog laser videodisks. The original items were first captured on individual frames of 35mm color motion picture film by Image Premastering Services, subcontracted by Sony. The photographers, who came to the Prints and Photographs Division to do the filming over a ten week period, ingeniously designed equipment and developed procedures to do the job safely, quickly, and efficiently. We invested considerable time in gathering the material, preparing it for handling, and determining the correct sequence for filming. After review by the Division's curatorial staff, the film was transferred to videotape. The videotape "premaster" then was used to make a metal disk master, from which copy disks were pressed.

Access

Now for the matter of access. A file of captions for the images on the P&P videodisk did not exist. Given the project's time limit, it was tempting to devise a data format and specifications that simply would satisfy our most immediate needs. National standards for cataloging original and historical graphics were not yet settled, and although MARC for Visual Materials had been drafted, the schedule for its implementation was unknown. The basic form and principles of the developing standards were clear, however, and the opportunity to test these guidelines and to refine and enhance them by practical application could not be passed up. Although the system was to be local and stand-alone, the conceptual links to the library world's communication format would pave the way to integration into LC's mainframe computer and eventually to national communication systems.

In a manner not possible when dealing with the mainframe system, we have been able to try a variety of approaches to our documentation for access to the videodisk. The videodisk image "caption" record consists of fields from the MARC Format, but there is a concentration on the controlled vocabulary access point, fields most useful for picture searching. They are structured descriptions which list, for example, the creator, title, date, copyright information, medium, reproduction copy negatives and transparencies, storage location, proper name and topical subjects, and the picture's videodisk frame number. In contrast to the cataloging done for material not on videodisk, lengthy descriptions are unnecessary because the picture is so readily available. The powerful retrieval software available for micros allows us to reduce the number of fields so that input can proceed expeditiously, and the researcher can formulate Boolean logic search queries that combine fields and data in ways one cannot in the mainframe system. In our case, we are using BRS/Search software on a Fortune microcomputer.

Recording Data

To further strengthen our ties with national standards, and to exercise their application in the area of pictorial control and retrieval, conventions for recording data follow existing guidelines. The descriptive cataloging portion of the record and name added entries are formulated according to AACR2 and its supplementary manual Graphic Materials: Rules for Describing Original Items and Historical Collections. Proper name headings are searched in the Name Authority File or, when necessary, are established by us according to AACR2, LC Rule Interpretations, and the Subject Cataloging Manual. Topical headings are drawn from the Division's Thesaurus for Graphic Materials, which will be published later this year. (All of this, of course, gives us experience that will help us when we start to use Visual Materials Online.)

Linking the System

The last refinement to the system is to create an actual link between the microcomputer and the videodisk. After finding one or more relevant captions in a data search, this interface will enable the user

to press a function key to bring up the matching image(s) on the video monitor. Because the pictures on the videodisk were filmed as collections and in logical sequence within them, the researcher also can simply browse through the images on the videodisk and press another function key to retrieve the matching caption(s). At last, simultaneous access to images and data will be achieved!

We actually contemplate a "two-tiered" system. Full MARC records representing whole collections and discrete units within collections will be input into MUMS using Visual Materials Online. Thus, the public will have pointers to pictorial collections as they search for books and other bibliographic formats on terminals throughout the Library. They then can search the microcomputer/videodisk database in P&P just as they would a book's index for a more detailed approach.

The videodisk has been available in the P&P Reading Room since June 1984. Three professional catalogers (the Division otherwise has only one full-time cataloger) and a library technician were hired in July 1984 to prepare the database. A terminal for caption searching was placed next to the videodisk unit in March 1985. By the end of June 1986, there will be nearly 10,000 records in the database. The interface between the micro and videodisk is expected later this summer.

The Optical Disk Non-Print Pilot Program has already proven to be a distinct success: we have a product that is useful to both staff and public. Every day we have new thoughts, new strategies, and plans that we now know could become reality. It has been a period in which imagination has been combined with experience to result in far more than we had ever dreamed possible. We have had the satisfaction of attacking the interrelated problems of preservation, collections management, access, and security--overwhelming in the Library's divisions holding pictorial materials--in a comprehensive way. If support of this program continues, we can throw off the yoke of the manual, indirect system of access. Hyperbole, you say? Well, seeing is believing.

Elisabeth Betz Parker
Prints and Photographs Division

THE FUTURE IS NOW

One of the reasons that the Future Issues Team of the Optical Disk Pilot Program was delayed in getting started was the enormity of the charge. Where do you start when the Deputy Librarian says, "Your job is to identify all the implications of this technology for the future of the Library of Congress and to make recommendations for how it should be incorporated into the Library's operations." Whew!! Just a few questions come to mind. Like:

Will the system go into hiatus at the end of the pilot? Will it be continued at a minimal level of effort? Will we continue to input materials? If so, will we continue to purchase extra subscriptions for the purpose? Will we continue to use what has already been input? What and how shall we communicate to copyright holders for transition from pilot to production? Who will be in charge of the system while it is in transition from pilot to production? Should another matrix be established?

How will the system be managed? Who will be responsible for management of the disks? What are the implications for custodial divisions? Will user stations be dispersed among reading rooms? Will they be centralized? How will materials be cataloged? Will a new cataloging division be needed?

Who will decide what will be put onto disk and what priorities will be established? When disks are available commercially, what should our acquisition policies be? What means of acquisition should be employed, e.g., copyright deposits, purchase? Should materials be retained in more than one format? If items are available in full text databases, should they also be put onto disk? What effect will copyright considerations have on the acquisition/selection policy?

What will be considered basic service, i.e., that which should be offered to the public without charge, and what will be enhanced service? To what extent will the Library subsidize costs, either printing costs or royalty payments? Should we lend disks or portions of disks? Should we copy articles, chapters, full documents, etc.? What charges should we apply? Who will bear telecommunications costs? Should we sell or merely lend the copies? Should we sell disks or portions of disks? How should fees be determined, both cost recovery and royalty? What provisions should we make for remote access? What needs to be done to obtain legal authority to collect royalty or other use fees from the public if this is necessary? Will changes to the copyright law be required? What role will interests outside the Library play in making these determinations?

What form of bibliographic control should be used? How should the materials be indexed? What automated indexes should be acquired, and how should they be linked to the optical disk system? Shall we develop our own software, or purchase software packages?

Will optical disk really serve as an archival preservation format? How will we accomplish long-term testing for preservation purposes? Will optical disk co-exist with microforming or will it replace it? How will the optical disk efforts relate to DEZ efforts?

What is the cost of putting material on optical disk as opposed to putting it on film or not converting it at all? What impact will this technology have on the Library's future space requirements, materials handling and delivery staff needs, collections maintenance, preservation, and replacement costs? How well does the optical disk technology meet LC's service needs and objectives? What alternative approaches should be investigated for comparison?

How much equipment will be needed? What are the budget implications for full-scale production? How much staff will be required and at what levels, for all functions, e.g., acquisition, bibliographic and technical processing, systems support, public service staff, and preservation testing staff?

What new standards are needed? What role will LC play in seeking their establishment? Will commercially available disks meet our own standards? Can oversized material be displayed and sections enlarged for easy viewing? How can the digital and analog systems be linked?

How will the Library interact with the private sector initiatives (both for profit and not for profit) in optical disk publishing? Will we encourage through technology sharing? Through equipment sharing? Through buying disks? What about our interactions with other countries, governments, libraries, profit ventures?

To begin to address these questions, the Future Issues Team, a group of high-level managers from throughout the Library, began meeting in June. After several months of deliberating, we have grouped the issues into four major categories, divided into committees, mapped out goals and objectives, and started to define task elements and resources required to produce a report by the end of 1986. John Finzi, Collections Development Office, chairs the Management/Policy Concerns committee; Lucia Rather, Processing Services, chairs the Library Operations Committee, assisted by Robert Zich, Planning Office; Winston Tabb, Copyright Office, chairs the External Relations committee; and Herb Becker, Automated Systems Office, chairs the Technology committee.

The challenge to this group--and, indeed, the whole Library--remains enormous. But the benefits offered by this technology are even more enormous, and we must have a plan to take advantage of them, or we risk being left behind, mired in the increasingly large problems of storage, access, and preservation of our vast collections. To paraphrase Pogo, "We have met the future, and it is now!"

Ellen Z. Hahn
General Reading Rooms Division

COMPUTER-READABLE COLLECTIONS

There is an increasing amount of literature published, for which access is through a computer. Educational, science, and business tools, juvenile literature, and large databases of social science data are available now, sometimes exclusively in computer-readable formats. The Library of Congress began to tackle the problems of providing access to these materials in 1982 when the Ad Hoc Committee on Selection Policy for Machine-Readable Publications was formed. This committee issued a report which defines the scope of the acquisition policy, the selection criteria for materials containing textual information, and the selection criteria for software. The policy guidelines adhere to existing philosophical principles of collection development. The Library will add or reject material for its collections on the basis of content, treatment, level, etc., not format. For example, ordinarily the Library will not select for inclusion into the computer-readable collections computer games or juvenile educational programs, just as it rejects high school textbooks and crosswork puzzles.

Task Force Formed

In late 1984 the Machine-Readable Collections Task Force was appointed to investigate the implications of acquiring, storing, and servicing machine-readable materials. The committee, which had representatives from all departments of the Library, made recommendations in four major areas: acquisitions, bibliographic control, service, and the establishment of a computer-readable collections reading room. The major recommendation concerning acquisitions involves amending the present copyright regulation so that software is deposited in its original format, instead of the "eye-readable" form now required by law. Producing access to online commercial databases and non-copyrighted databases, e.g., NTIS also is seen as important.

In order to make full use of computer-readable acquisitions, the Processing Department must be given the resources to give the collections full bibliographic control, and many service issues raised by the Task Force need to be resolved. Another important consideration is how to maintain an adequate level of security for the machines and software which are needed to provide access to these new collections.

Pilot Reading Room Recommended

The report's final recommendation, the establishment to a pilot computer-readable collections reading room--an "electroform" reading room--is perhaps the most far reaching. The reading room will be modeled after others in the Library which are organized around the format of the materials, rather than the subject matter, e.g., Prints and Photographs, Motion Picture and Television, and Microform Reading Rooms. Establishing a pilot reading room is an important first step because the equipment and materials to be housed are expensive and delicate. A pilot reading room will help us learn about software security and hardware maintenance.

In late 1985 William J. Welsh, Deputy Librarian of Congress, approved the Task Force Report and charged the Office of Planning and Development and department liaisons with the responsibility for directing its implementation. Although the group has just begun its work, the building of the foundation needed for the implementation of the Task Force's recommendations has started. Processing Services has begun work on MUMS MRDF (Machine-Readable Data File), so that these materials can be cataloged. The CIP division has spoken to several software publishers who have agreed to participate in a pilot CIP program during late 1986 and early 1987. Other publishers will be contacted closer to the beginning of the project. The Research Services Department has begun to investigate possible locations for the pilot reading room, and the Copyright Office has planned strategy for making the necessary changes to the copyright regulation.

The size of the Library of Congress sometimes inhibits the development of new facilities and services, but it is the size which also will help to build this facility and its collections into a rich, diverse research tool. With the continued proliferation of publications in computer-readable form, we can expect the demand for these materials to grow. The project we have now begun will permit us to meet the challenges of acquiring, storing, and servicing these collections.

Victoria Reich
Planning Office

COPYRIGHT ENTERS THE INFORMATION AGE

When I was asked to write about the ways that new technologies are affecting the Copyright Office, I thought first of a list:

computer programs
machine-readable data bases
video games
compact digital discs
cable television programming
ROMS -- read only memory computer chips
semiconductor chips

All of these high-tech materials have troubled the still waters of the Copyright Office during the last few years and will continue to trouble them for many more. The high-tech nature of copyright is a surprise to many people who think of the Copyright Office as an old-fashioned place. They expect to see waist-coated gentlemen and women plying quill pens to maintain meticulous records of copyright registrations.

Indeed, those records are meticulously kept, but the scratchings of quill pens have been replaced by the humming and beeps of terminals as Copyright Office employees translate the prosaic details of half a million copyright registrations annually into computer languages. As revealed by the list above, there is no longer any musty air to the issues that Copyright Office staffers confront.

To help understand this high-tech age, I decided to explore why the Copyright Office now seems to be on the cutting edge of new technologies and why it is good that it is. There are three parts to the why: 1) the extraordinary growth in information technologies; 2) the arrival of the Information Age itself; 3) the strength and elasticity of our copyright law.

Growth

Rapid advances in communication and computer technology have changed everything about the way we learn, communicate, and entertain ourselves. According to a report released in 1982 by the Office of Technology Assessment, major leaps forward in many technologies have shaped the information revolution: cable systems, fiber optics, satellite communications, digitized storage of information, broadcast technologies, computers, storage technologies (floppy disks, chips, etc.), video technology and information networks.

Just how striking a change this is was assessed by Senator Charles McC. Mathias, Chair of the Senate Subcommittee on Patents, Copyrights, and Trademarks, at a hearing in April 1983. He said, "I believe these decades may be a time of transition not different from the time just after Gutenberg invented movable type. For the 50 years after Gutenberg, the world was in transition as new methods of creating copies were used ...then, anyone who could get a text could reproduce it...today for different reasons we are facing the same issues."

The Information Age

In December 1984 the Copyright Office issued a report which pointed to the arrival of such an information age. The report, entitled "The Growth and Size of the Copyright-Related Industries," noted that the industries such as book and music publishing, audio and video recording, broadcasting, advertising, computer software production, and the motion picture industries are fast overtaking heavy industries in the United States. The report stated, "During the last two decades the copyright industries in size surpassed farming, automobile manufacturing, and now rank second behind only the medical health industry."

Strength of Copyright Law

Another "why" of the burgeoning is the existence of our strong and elastic copyright law. Copyright, which was in its origins an instrument of repression, is now an instrument of freedom. As former Register of Copyrights David Ladd pointed out in his Brace Memorial Lecture on The Concept of Harm in Copyright, "The marketplace of ideas which the First Amendment nurtures is essentially a copyright marketplace." He added, "Copyright sustains not only independent, idiosyncratic, and iconoclastic authors, but also fosters daring...risk-taking publishers." It is the freedom provided by a strong copyright law that has encouraged U.S. creators, authors, and publishers to enter the Information Age with gusto. This was not always so.

The 19th century provides an example of the peril of weak copyright laws. Before the United States adopted an international copyright law in 1891, U.S. publishers pirated books from other countries, especially England, making it hard for home-grown American authors to market their works. When Charles Dickens visited America in 1842, he chastised the many American publishers who were pirating his books. He told them to accept the idea of international copyright "first, because it is justice; secondly, because without it you can never have and keep a literature of your own." After the U.S. adopted a strong international copyright law, it was no longer profitable for U.S. publishers to pirate foreign works. Only then did U.S. publishers begin to print and nourish our own writers.

When copyright is strong, there is an incentive to create. Because the 1976 Copyright Act was created with enough elasticity in it to protect most of the new high-tech forms of communication, the incentive exists not only for the creators of books and music but also for the creators of software, data bases, and digital discs.

And so too has the Copyright Office proved flexible enough to respond creatively to each new high-tech development. Each time the Copyright Office meets a new

technology, it is like introducing one's self to a potential friend: first a little suspicion, then a long chatty time to gather information, and, finally, a comfortable relationship. During the last four years, the Office has gone through all of these stages with the new high-tech developments and has responded successfully to the challenge. We set up Task Groups to define issues and develop policy, we wrote regulations, reported back to Congress, and, always, invented new ways of dealing with new materials.

A sampling of four years of headlines in Copyright Notices shows what some of the challenges were and how the Office met them:

President Jimmy Carter Signs the Computer Software Computer Copyright Act of 1980. (January 1981)

The Copyright Office responded quickly. A Study Group on Software assessed the issues, developed examining practices, and wrote draft guidelines. The Examining Division developed a policy on whether to accept object or source code as an acceptable computer program deposit. The Office began to develop a regulation to cover trade secrets, often a problem with computer programs and to cover special relief. Finally, guidelines to assist in cataloging these works were developed.

Copyright Office Accepts and Registers First Machine-Readable Data Base (April 1981)

Registering data bases presented troubling new problems for the Copyright Office. For example, since a data base constantly changes from day to day, what should the identifying deposit be? Furthermore, when is a data base "fixed" for copyright purposes?

In 1983, when OCLC asked to register its bibliographic data base, new issues were raised: when is a data base "published" for copyright purposes? What would an adequate copyright notice on a data base be? The Office responded again by developing new regulations on deposit for data base registrations, developed after consultation with the industries involved.

Copyright Office Registers First Video Games (1981)

Those of us who were addicted to the sight of the monsters Inky, Blinky, Pinky, and Clyde gobbling up Pac-Man will be happy to know that those characters are protected by copyright against the incursions of Puc Man, Pucky Puck, and Munchyman. In the Copyright Office examiners began to learn the ins and outs of examining video games, looking either at the computer program or the audiovisual game embodied in the work. Because the games were often involved in litigation, the Office developed ways to offer speedy special handling.

CABLE TV-- Register of Copyrights Recommends Transition to Free Market for Cable (August 4, 1981)

Although the Copyright Office has had a rocky relationship with its administrative functions in regard to cable television, our own Licensing Division quietly goes about its business of collecting and accounting for royalties for the copyright owners of programs transmitted by cable operators. The Office also works and reworks its regulations, responding to the sometimes conflicting decisions of Congress, the Federal Communications Commission, the Copyright Royalty Tribunal, and the Courts.

Copyright Office Testifies as Senate Considers Off-Air Taping (May 1982)

Videorecorders (VCR'S) caused much furor when the Betamax case arose. After University City Studios and Walt Disney Productions sued Sony for copyright infringement, cartoons and editorials created visions of video police raiding our homes to grab unauthorized copies taped off the air. The Copyright Office developed testimony to present at hearings as Congress considered whether there should be royalties on blank video and audio tapes royalties to compensate copyright owners for the use of their works. But visions of video police ended when the U.S. Supreme Court decided in January that time-shifting programs was "fair use."

Copyright Office Reports to Congress on Libraries and Photocopying (January 1983)

In eight enormous volumes submitted to Congress in January 1983, the Copyright Office tried to provide guidance to librarians on the heretofore fuzzy issue of photocopying practices in libraries. The writers of the report aimed at balancing the admirable concern of librarians for giving optimal service to users with the equally authentic need to preserve the incentives and profits of the creators of the printed words being photocopied.

SENATE HOLDS FIRST HEARINGS ON THE SEMICONDUCTOR CHIP ACT OF 1983 (May 1983)

These hearings led to the creation of an entirely new form of intellectual property protection --protection for mask works fixed in the integrated circuits known as semiconductor chips. This protection was steered away from being classified as "copyright," and into a new form of federal statutory protection. The Office of the General Counsel prevailed and kept copyright itself better limited to the protecting literary works, musical works, dramatic works, pictorial, graphic and sculptural works, motion pictures and sound recordings. The Copyright Office now administers the Act--several staffers daily work on the issues involved with registering the mask works of chip designs.

And so it goes. These are only a few of the headlines that describe the constant high-tech crises in the Copyright Office. But the Office is always up to the challenge--we have learned to love high-tech. It's an exciting time to be here.

Susan A. Robinson
Copyright Office

MICROCOMPUTERS IN THE CONGRESSIONAL RESEARCH SERVICE

Nineteen eighty-five was the year of the microcomputer in the Congressional Research Service. First introduced in January, by the end of the year there were nearly 100 micros in use among CRS' 850 employees; we expect at least three times as many in the future. For the present, primary emphasis is being placed on improving and speeding up analysis. Within the next few years, however, CRS probably will rely on microcomputers for word processing also.

The introduction of microcomputers began only after two years of exploratory work and preparation by committees of potential CRS users assisted by experts from the Office of Automated Information Services (AIS) and occasionally by outside contractors. Energetic efforts have been made to coordinate certain necessary adjuncts, such as training on machines and software.

Preliminary Work

In December, 1982 then CRS Director Gilbert Gude appointed an exploratory committee composed of management personnel, including some computer buffs, other potential users, and the coordinator of AIS to survey the terrain to be traversed in moving toward the microcomputer era. Gude deliberately placed the users in a central role in mapping this course so that their perspectives would be represented directly in the decision-making process. After an initial orientation, the exploratory committee sought assistance from outside consultants.

In August, 1983 a request for proposals to assist in formulating a plan for introducing microcomputers was issued. In September Arthur Young Associates was selected as the contractor from among three bidders. The company interviewed the chiefs of CRS' nine divisions and heads of its administrative offices as well as a sizable sample of staff members throughout CRS. Through this process a detailed appraisal of machine needs with extensive documentation on potential uses was made.

The Arthur Young report concluded that CRS should install about 200 microcomputers during the next three years and that an experiment be conducted during the first year, linking some machines in local-area networks to several terminals, using one central processing unit, accessing common data and software, and communicating with each other.

The CRS committee accepted most of the Arthur Young recommendations in principle. Implementation was delayed until fiscal year 1985 to assure compliance with the Library's ADP planning process. CRS also deferred the networking experiment until at least the second year because of the underdeveloped state of software for multiuser systems, the greater need for maintenance and technical assistance for the more complex technology, and the fact that CRS analysts typically work independently rather than in teams.

Introduction of Machines

Selection of the equipment was complicated by the fact that microcomputer technology and software is leapfrogging forward in capability and falling back in price. Working in close collaboration with the Library's Automated Systems Office (ASO), in November 1984 CRS placed orders for 37 Compaq Deskpros (Model II) and 25 IBM-AT ("advanced technology") machines, the latter to be equipped with hard disks for large-scale computing and storage capacity. The IBM-AT, which had just become available, represents a giant step forward in speed and capability, but at the price of about $4,500 it costs roughly 50% more than the Compaq Diskpro, and its capacity is not needed for many uses in CRS.

Delivery of all machines was expected in early 1985, and, in fact, the Compaqs were delivered on schedule and distributed to users. IBM, however, encountered problems in meeting its delivery schedule for the AT's, apparently because of difficulties in locating suppliers of hard disks. Delivery was delayed for nearly five months; the first AT's were received in June.

Strategies in Introducing New Technology

Some division chiefs feel that microcomputer technology can be introduced most effectively by providing as many machines as possible to analysts, with the ideal being one machine for one person. While this density is not quickly attainable under today's budget constraints, the strategy rests on the belief that uninterrupted access is necessary to induce analysts to invest the time to learn to use this powerful new technology to the optimum extent. Seeing many colleagues experimenting with new techniques also stimulate staff to acquire computer skills and provide a good environment for information exchange. This could be referred to as the "critical-mass theory" of technology introduction.

Other divisions adopted a more conservative approach, defining machine needs in terms of current requirements and realistic growth in usage. Staff members are enrolled for training either because they need it for current work or because a job is being assigned that can be done better using a computer. On the principle that what is not practiced is soon forgotten, some managers believe that training for which no near-term use is evident probably will not pay off.

The chief of one CRS division, who has experience in managing the introduction of new technologies, proposed to convert his division entirely to microcomputers, including its word-processing operations. This anticipates a change that will be required throughout the Service by 1987, when the availability of spare parts and service for CRS' present word processors will decline. This division is providing a pilot test for the Service in the wholesale change to microcomputer technology by training its support staff to work on microcomputers and procuring high-speed, laser-jet printers for text production.

Providing Management Oversight

As microcomputers were becoming a reality in CRS, Gude restructured the exploratory committee into a management committee which included representatives of each division, the administrative offices, and AIS. the purpose of this change is to assure that the management of each unit has a voice and that management is informed of issues and actions. The committee also serves as a forum for regular communication among the users and the automation experts in AIS. Among the concerns of this group have been training, copyright observance, and security.

Training. Of some 600 research staff and 250 support personnel in CRS, only about 100 had relevant prior experience with computers. It was critical to begin training concurrently at the time of delivery of the machines.

It was with a sense of urgency, therefore, that a subgroup of the Management Committee, assisted by AIS staff, issued a request for contractor proposals for development of a training program. In the process this group had to decide which software programs would be supported with formal training and troubleshooting services. The training was to cover all major functions of microcomputers in CRS: spreadsheets (i.e., entry and manipulation of numerical data); data-base management (manipulation of lists and files); word processing (text preparation); and graphics. They decided to develop and test courses in several of the most popular programs in these fields: LOTUS 1-2-3, SuperCalcIII, dBase III, and WordPerfect. (In addition, courses are given in microcomputer software designed especially for users of Lexitron/Raytheon word processors.) An introductory course on the microcomputers' Disk Operating System (DOS) is offered to familiarize employees with the basic functions of the new machines.

The contract for developing and testing a training program was awarded to WordPro, Inc., a firm in Rockville, Maryland. At LC WordPro has taught courses and seminars for users within every CRS division.

More recently, requests have been made by employees for training in specialized software for drawing charts and graphs and for communication with outside data bases and mainframe computers. The Management Committee with the help of CRS automation experts has chosen packages for which training and troubleshooting help will be provided.

The proliferation of software knowledge also has proceeded informally among computer users. It is assisted by a Microcomputer Users' Group, which meets periodically for information exchange, demonstrations, and gatherings of subgroups with specialized common interests. The User's Group also circulates an informative newsletter.

Copyright Observance. Most computer software is copyrighted and sold under licensing agreements that limit or prohibit copying and may restrict usage to a single machine. The prices of some programs--$600 or more--could pose temptations to violate the restrictions for employees who have machines at home or even for those who need multiple copies at the office. The Library of Congress, which administers the copyright statutes through the Copyright Office, must be especially scrupulous in observing those laws.

In a memorandum to all employees, Gude laid down an unambiguous policy regarding copyright observance. An accompanying series of questions and answers emphasized that illicit copying is a crime and that individuals as well as the institution could be sued or prosecuted for infractions. All software is issued to individuals with the licensing agreements attached; copies of licensing agreements are filed in computer rooms; and, tables summarizing provisions of agreements for popular software are posted.

Machine and Software Security. In the summer of 1984, a new IBM personal computer, plus printer and manuals belonging to a contractor disappeared from a locked office of the Madison Building over a weekend. In light of this occurrence, the Management Committee is concerned that adequate security be provided both for the microcomputers and their peripheral equipment, as well as for software.

On an interim basis, this concern has been assuaged by providing locked overnight storage with restricted access. In the longer run high-value equipment will be anchored to its furniture to make removal from the premises difficult. Software is protected by secured storage when not in use, and access and accountability are provided by sign-out systems.

What Advances Do Microcomputers Make Possible?

The primary motivation for introducing microcomputers is to enhance the analytical capabilities and productivity of the CRS professional staff. Although analysts also use the machines for drafting text, word processing has not been a primary consideration. Existing equipment for word processing is adequate in most parts of CRS.

Using the new machines, CRS analysts can array and manipulate numbers and other date for many purposes. Budget analysts can tabulate appropriations and update and project them into the future almost instantaneously by using alternative assumptions. Economists download elements of the national income and product accounts automatically by telephone from databases on computers in other cities, calculate growth rates and relationships and project them into the future. Analysts test for statistical relationships among data and calculate regression equations. For both analysis and reports, the computers produce graphs (line, bar or pie charts) to make data relationships more readily visible. Other analysts can maintain and sort other types of databases. For example, a list of several hundred Nobel Prize winners was arrayed alternatively by nationality of birth, location of education, location of prize winning work, discipline, and so on. Programming for their own applications, researchers can construct analytical models. One demonstrated recently deals with relationships between the U.S. and Soviet strategic arsenals under various assumptions about weapons capabilities and arms control restrictions.

Analysts will be able to obtain information from many data bases around the country--economic data, political survey data, environmental and legal information--for further processing. The microcomputers also will be able to access the Library's automated book files, such as MUMS and SCORPIO.

While word processing ranks behind analysis in priority, analysts are being trained to draft text on the new machines. To enable support staff to make revisions and to produce final copy on the Raytheon word processors, material now is transferred routinely from microcomputer disks to Raytheon disks by linking the machines via "null model" cable. In the course of the next few years, as the Raytheons are phased out and CRS converts completely to microcomputers, all support staff will be trained on the new systems.

Future Issues

With the arrival of the IBM AT's, CRS is entering a new era of computing power which will expand possibilities for analysts in ways they have not anticipated. New problems for management to solve

will include security for these high-value machines, training to use the systems for organizing materials in large-volume hard-disk storage and permitting access, while protecting against unauthorized or inadvertent tampering.

Finally, the Management Committee has established a Subcommittee on Local Area Networking to examine the complex issues of transmitting voice, data and image communications among computers, including transmissions to Congressional offices. This technology will require not only selection of the most suitable equipment and software for the job, but also finding safeguards to assure adequate review and quality control for CRS work going to the Congress.

William A. Cox
Congressional Research Service

INQUIRY STATUS AND INFORMATION SYSTEM (ISIS)

The Congressional Research Service provides Congress with the most reliable and timely analysis and research possible; the automation system which gives the status of CRS' workload is ISIS --Inquiry Status and Information System.

With the expansion of CRS following the Legislative Reorganization Act of 1970, the need for an automated system became evident. As CRS grew, so did the number of Congressional requests. There was concern that work might be unreported and that the statistics might not accurately account for volume or types of responses. Also, the method used for tracking and identifying the status of requests was becoming more difficult to maintain. Further, CRS needed reliable statistical data for future budget, program, and personnel planning, and management needed to know the status of the backlog and deadlines for completion of responses. Finally, it was important to have immediate access to the status of an inquiry when a Congressional office called to check on the progress of an inquiry or to modify the request.

System Needs

After several years of analyses and experiments with small-scale automated systems, CRS turned to the Library's Information Systems Office (now the Automated Systems Office -- ASO) in 1976 to develop a system that would meet the following goals:

- transmit requests to the appropriate action point;
- determine the status of inquiries in response to the hundreds of call-backs received each week;
- trace trends in information and research requirements of the Congress;
- maintain an appropriately balanced staff with the necessary subject expertise to keep pace with the changing concerns of Congress;
- provide the data necessary to inform our oversight committees of CRS services to the Congress, projected future needs, and added resources CRS requires to fulfill those needs;
- provide current reports of pending workload to division and section managers so that appropriate and efficient assignments can be made to meet client deadlines.

Preparation and Implementation

To prepare for automation, CRS designed new forms, revised division/section/unit codes, and expanded the codes which identify the Congressional requesters. The codes for "types" and "forms" of response were also received. The type-of-response code is a key element in identifying CRS services and products, and the revision of these codes received major planning attention. All revisions went into effect in January 1978, and during the next four months, CRS addressed and resolved any problems connected with them.

In April 1978, ISIS was implemented and made accessible through terminals in the Inquiry Section. Because of the limited number of terminals, they were shared by two staffs: inquiry staff during the day and the newly-hired production staff at night. After the move to the Madison Building in 1980, there were enough terminals to be placed in both the Inquiry and ISIS sections.

The ISIS production system operates on a Data General Eclipse C/360 minicomputer. Besides the on-line system, there is a back-up system which is also used for program development and testing. CRS staff use Data General Model 6053 video display terminals. These terminals are "hard wired" -- accessed directly to the minicomputer rather than through a leased telephone line. Access is available only to authorized users who enter a confidential system of passwords. ISIS is not tied in with SCORPIO or any other system because, consistent with CRS confidentiality requirements, measures must be taken to protect the security of data. Flexibility and growth limitations are imposed by these necessary security conditions.

Current on-line functions that can be performed by authorized CRS staff include the following: enter and update Congressional inquiries in fanfold format; enter completed inquiry data; enter pending major projects; enter completed major project data; enter and complete Issue Brief, CRS Report, Reading Room/Reference Center, and telephone-only requests (each of these uses different screen formats); enter, update, and display requester file; enter, update, and display divisional information; review pending fanfolds; search for inquiries by requester and date range; display "call-back" messages; check status of inquiries; display completed data; print fanfolds locally and remotely to divisions.

The Process

Reference and research requests received in the Inquiry Section are entered directly into ISIS and printed on a "fanfold." These records will remain in the system as pending until the request is completed, the cleared copy of the fanfold is forwarded to the ISIS section, and the cleared information is entered into ISIS. All other requests (direct division receipt, telephone only, Issue Brief, CRS Report, and Reading Room/Reference) are entered by the ISIS Section after completion. The divisions send completed records to the ISIS Section daily and the turn-around time for these to be completed is one day.

On a regular basis (weekly, monthly, quarterly) reports are run by ASO to provide information to management. These reports which are available for CRS as a whole and by division and section include total cumulative number of responses and hours spent on those responses, types of responses, breakdown by

request and elapsed time. Other reports list all inquiries indicated as pending within a division. Reports are produced to reflect the status of major projects --major research usually taking a minimum of 80 hours of research time. These reports provide titles of projects pending or completed; research hours reported each month; initiation date; division(s) involved. Major project statistical reports are broken down by Member/committee/anticipatory categories; interdivisional participation; and number of projects initiated, in progress, cancelled, or completed during the reported period.

The data entered and the reports derived from ISIS concern official Congressional work. ISIS is not a researcher time-accounting or cost-accounting system; rather, it reports CRS workload in response to or in anticipation of Congressional requests. To give an idea of volume, CRS completed 442,247 Congressional requests in FY'84.

Through ISIS, CRS continually strives to provide a more sophisticated management information system within a secured minicomputer system. A set of development priorities has been established and, with ASO, ISIS management is developing the following:

Major project subsystem redesign--to provide a special automated system to manage the intricate process of major project reporting and counting.

On-line display facility--to provide one video display terminal to each division and allow division managers direct access to the on-line display of pending requests and to information relating to the status of requests;

Division assignment capability--to allow division managers to enter section assignment on-line so that location and status can be easily determined;

On-line editing--to perform extensive on-line validation of data;

On-line subject directory--to automate the extensive listing of subject areas with their appropriate CRS referrals.

Brenda Wesner
Congressional Research Service

ELECTRONIC MAIL AND ITS USES

Electronic mail is being used by staff members in all departments of the Library of Congress. Although it does not replace the telephone or the written memorandum form, it does facilitate the communication between two or more individuals and ensures that accurate messages are received as intended. It has introduced a new part of office automation to the Library.

The Library uses eMAIL from ADR (Applied Data Research, Inc.) and has established a network of users throughout its three Capitol Hill buildings as well as the Taylor Street Annex, the Navy Yard, and Library reading rooms maintained by the Congressional Research Service in the House and Senate Office Buildings. eMAIL is available to anyone with intra- and/or interdepartmental interests and responsibilities. It is accessed via terminals connected to the Library's main computer located in the Automated Systems Office in the James Madison Memorial Building. A staff member may request an account from the department automation liaison, and when an account has been approved and opened, the individual establishes a personal password to ensure confidentiality of mail to and from his or her electronic mailbox.

The organization network in the Library of Congress currently contains more than 800 names of individuals and sub-networks which have been defined as individual addressees. Depending on the type of terminal available to a user of the system, eMAIL is either a full screen image or one-line teletype image. Regardless of the terminal, however, the functions and capabilities are the same for all users.

Uses

Before eMAIL was selected and installed in the Library, tests were performed to determine whether or not electronic mail was useful and, specifically, which of the several versions would best serve the population of the Library. The ADR package was chosen because of its versatility in doing things other than the simple sending and receiving of messages. Some of these capabilities are described below.

Electronic Filing System

Staff members who serve on various committees or who are involved in long-term projects are able to set up and maintain files of work and correspondence. Files can be set up to hold minutes of meetings, outlines of work, or lists of things to be done. Anyone may show the contents of personal files to someone else, but the files are accessible only if the owner wishes them to be. Files also can be made to hold all messages concerning the same subject or from the same person.

Every file that is created has a menu made automatically which lists every item contained and the date items were accessed last. A file of items can be edited at any time, just as a paper draft can be, and finally can be sent to someone as an electronic message. A list of "things to do" allows people to remind themselves of pending work or appointments as often as needed or desired, at any time of the day chosen.

If it is necessary or desirable to do so, items in a file or messages received can be printed on printers near the user's work area. This print capability is an added convenience, but is not the only way of sharing information from the electronic network.

Conferences

Just as it is possible to make conference telephone calls, it is also possible to send messages to entire groups, i.e., networks, with the capability of all recipients being able to read every other person's response to the originator. This is a convenient way of gathering opinions and setting up meetings without

telephone calls back and forth. A message can be retained for as many days as desired by the originator, up to "permanent" status, so that the information is available whenever an individual returns to work.

Time-Triggered Mail

Supervisors and committee chairpersons use this feature to remind others of obligations by pre-setting dates and times. This is of particular value if someone is going to be away from work for a period of time; one can write messages and reminders to individuals, and mail will be delivered on whichever day and time setting has been given. To ensure that mail is read and answered, or at least acknowledged during one's absence from work, a surrogate can be named. This person can then handle the absent person's mail as instructed, so the sender will have a response.

Classes are being held throughout the Library to teach staff members how to use eMAIL and take advantage of its time-saving and convenience in their own particular jobs.

Barbara J. Finfrock
Automated Systems Office

SHELFLIST SERVICE AND eMAIL

In the fall of 1984 the Shelflist Services Unit of the Shelflisting Section (Subject Cataloging Division) began the first Library-wide application of eMAIL, the impetus having come from a suggestion/incentive award proposal by Joseph J. Keenan and William F. Sundwick. I discovered when the 1984 LC Intern Class was assigned to the Subject Cataloging Division that Ms. LC eMAIL was Intern Barbara J. Finfrock. Within a few hours Barbara and I set up preliminary procedures to start reference service via eMAIL.

The Shelflist Services Unit provides location and copy information for books to reference librarians and others in the Library. In addition, we attempt to track down books in-process for reference staff.

Old Procedures

Prior to eMAIL people telephoned the Shelflist Service Unit. Since the assistant could not respond to questions without leaving the telephone and desk, i.e., be in two places at once, we had installed a telephone answering machine to record incoming requests when the Location Assistant was not present. Upon returning, the Location Assistant would listen to the tape, record the incoming requests, and later, attempt to contact the reference librarians only to find that they often were absent from their desks. We left messages with colleagues, but sometimes the messages were lost or never transmitted to the appropriate person. Additionally, at the outset of hearing a pre-recorded tape, many people simply hung up and did not leave a request.

Developing eMAIL Procedures

At the outset the reference librarians from the Loan Division served both as guinea pigs and designers of a workable system. Our eMAIL address was established as "**Shelflist reference,**" and we started operations. We decided that the call number or Library of Congress card number (LCCN) for books-in-process should be indicated in the subject line of the electronic message. In the message text area, the questions "How many copies? Assignments?" were answered. Next, we decided to have the requesters call up the "send" prompt screen and implement two functions: 1) Set the print function, so we would receive a hard copy which we needed to search the shelflist on-site; 2) Set the reply request function, so we could not ignore the request--eMAIL will not let a message be removed without a requested reply being answered. These procedures enabled us to receive shelflist reference requests via electronic mail; next we had to decide how we were going to proceed from our end.

Requests for shelflist information are received on the same printer used in our bookpaging activity. They are placed on the Location Assistant's desk. The majority of the requests are answered within two hours. We set our function keys to eliminate the redundant keying of commands. We set function keys for inbox, view 1,2, etc., reply, return directed, etc. Initially, we established a folder for answered requests, but quickly discovered that we hardly ever referred back to answered requests and when we did, the "file 13" folder served our purposes.

Soon we found that we needed to establish a way to identify Congressional requests of an urgent nature and requests for readers who could wait no more than one or two hours for a response. We devised a technique that clearly identified these items for the Location Assistant.

The use of eMAIL for shelflist information quickly spread to the Special Search Section, Photoduplication Reference Service, Science and Technology Division, and the General Reading Rooms Division. Thus far, we have had a 500 percent increase in requests for information. We have responded to this increase by adding another full-time staff member.

Quality Control

Occasionally, we are unable to locate by call number the item in question. Since many of our users provide author/title information, often a quick search of MUMS locates the proper call number of the item requested. In the majority of cases, a typographical error was made by the original requester, although we also discovered errors in the online database. Therefore, an added benefit of this service is a sort of quality control of the online file. We encourage the reference staff to report call number discrepancies between the online catalog and the shelflist.

Also, since we use our inbox as an index to requests requiring immediate replies, we created a file to hold requests that require in-depth searching, such as for books-in-process. Requests of this nature are placed in the file "permanently," that is, until we are able to provide a positive response to the requester. Thus far, we have located about 80 percent of the items requested within a reasonable time. We hope this success rate will increase with the heightened

awareness to charge materials within the Processing Services Department, plus the newly implemented procedures for the charging of serials in the Subject Cataloging Division.

Recently, we introduced another Library application for electronic mail. The Shelflist Services Unit has the responsibility for ordering books from the general collections and from the Law Library for the department staff located in the Madison Building. Staff members now can order materials via eMAIL provided they notify us and receive our instruction sheet. We make responses to bookpaging requests through eMAIL.

At the present time the only drawbacks we see with eMAIL are that too few staff members have access to eMAIL, some are reluctant to use a new technology, and we suffer a lack of terminals within the unit. It is hoped that these drawbacks are merely temporary. By the way, if you are one who is resisting change, telephone reference service is still available on extension 7-5790!

Cynthia J. Johanson
Subject Cataloging Division

AUTOMATED BIBLIOGRAPHIES : STILL WAITING

In the spring of 1979 the idea of producing bibliographies by automation sounded simple and ever so promising. In an often quoted report of that year, LC Intern Ruta Pempe asserted that "the powerful capabilities already developed over a decade for cataloging need relatively small adjustments to meet the requirements of producing subject bibliographies."

Her report projected data files created by retrieval of machine-readable records from MUMS. These custom designed databases would feature online searching and editing. Data for analytics (articles from journals and essays from anthologies) would be input independently in a manner that was yet to be determined, but would probably involve some linkage to the container's record. The output from these working files could be sorted by subject tags and arranged alphabetically for publication in hard copy. Selection of newly acquired items for quarterlies or annuals could be made easily. At the same time online users could review the whole database searching by subject, author, title, and all the other indexed tags. An unedited and unpolished file could be kept user-confidential until ready for general search.

For bibliographers, the prospects were breathtaking. No more dusty file boxes of 3 x 5 cards; no more hand sorting and alphabetizing; no more paper clips and broken rubber bands; no more fruitless searching for the lost item that was somehow misfiled, but is now desperately needed. We could create databases! New items found in the course of professional reading or deliberate searching could be routinely entered. Retrieval could be achieved as needed for a reference letter, a short list of timely items, or a major bibliography.

Best of all, efficiency of publication would be enhanced immensely. No longer would anyone have to hand a stack of cards to a typist, who would prepare a list which then had to be proofread against the cards, returned for correction (which often involved erasing and retyping), and checked for adequacy of corrections made. No longer would this painstakingly produced typewritten list be sent on to a typesetter who would set the list all over again and return proofs that had to be checked again against the typed copy and sometimes against the cards. Automation would virtually guarantee that an item that was correct in the database would be correct in the finished publication. We could publish selected compilations with ease, while online access would make our materials readily available for other inhouse users.

COMBAT Formed

To implement the automation process, a series of requests and proposals was generated. Following distribution of the Pempe report, ASO in 1979 convened a working group on LC standard formats. At the time the focus seemed to be on COM outputs, so the committee took the acronymn COMBAT for "COM bibliographic advisory team." A subcommittee was organized to design output for bibliographies produced by automation. Also, in 1979 Sally McCallum of the Network Development Office wrote a draft proposal of a method for inputting analytics, "a set of guidelines and new fields that would be defined across the MARC formats to contain the link of the analyzed part to the item that contains it."

In 1980 Research Services submitted a formal request to ASO for a bibliography automation project. This request was to "consolidate and augment current automation tasks relating to bibliography automation into one automation project." In 1981 the COMBAT subcommittee distributed its final report with recommendations for layout, indexing, and entry format for automated bibliographies. It also called for establishment of a bibliography committee and a revision of the LC style manual Bibliographical Procedures & Style (originally published in 1954 and reprinted in 1961). In 1981 ASO responded with a task definition for a "Prototype Bibliography Handbook," namely the Handbook of Latin American Studies. Although the machinery moved slowly, it appeared that things were finally rolling.

Problems

As it turned out, probably not surprisingly, the road to the bibliographic heavenly city was strewn with rocks and ashes and a few seemingly insurmountable boulders. It is impossible to recite these problems in detail, but they included the following: reluctance of the Processing Department to allow editing or manipulation of cataloging records even in files that were clearly independent of the original MUMS database; disputation about index terms and controversy over individual thesauri vs. LCSH for all; failure to agree on a method for encoding analytic data in MARC formats; concern for authority control and fear that respect for established names and subject headings might be eroded; distaste among bibliographers for new entry formats, based on AACR2 cataloging and ISBD punctuation that would violate many long-standing traditions; and technical difficulties encountered by ASO in the design of the requisite software, a task that had once seemed so straightforward.

In 1984 ASO convened a meeting of LC personnel interested either peripherally or directly in bibliographic production. Thereafter, listening to and presenting a variety of reports, ASO conceded that it had not been able to make progress on the automation of bibliographic production and announced that the Cataloging Distribution Service was taking over the project.

Achievements

Fortunately, during those slow years of the early eighties staff who were actually compiling bibliographies or managing data bases had been learning some things. In a project that was independent of bibliographic automation, the Main Reading Room reference collection catalog was put into a machine-readable file, demonstrating that locally managed files could be drawn from MUMS. Data are input into the file from the database using the record number. Corrections and minor editing changes can be input directly into the computer via Four Phase terminals. The file is not accessible online; processing is done in batch and newly input data can only be viewed in printouts and diagnostics. However, catalogs of the database have been generated and published. Quarterly updated shelflists are issued to interested reading rooms. Online access has been long anticipated, but no dates are offered.

In another small step forward GRR bibliographers discovered that the Composing Unit of Central Services is as firmly established at the forefront of technology as any unit in the Library and is wonderfully cooperative about making its services available. In 1982 a bibliography was photocomposed by them from data that had been input on Lexitron tape and transfered to computer tape which the composing machine could read and spin out into text. More modern equipment now in place can read directly from floppy discs input at the Compucorp. The benefits are two-fold. We have good-looking copy done just the way we want it, and we are freed from 95 percent of the tedious and time consuming multiple proofreading that we used to do.

Thanks to word processing and the composition capability of Central Services, bibliographic production in GRR is speedier than it was in the manual production days. We achieve a finished product more efficiently than we did ten years ago, but we still have portable file boxes and handwritten notes, and we still lose data. We explore creating data files on floppy discs, but grow discouraged. We wonder if microcomputers would help us--if we can ever get microcomputers. When we hear rumors that new developments are coming, we listen with skepticism born of long disillusionment. Bibliographers are ready to automate, but we are still waiting.

Marguerite D. Bloxom
General Reading Rooms Division

HLAS: THE ROAD TO AUTOMATION

An internationally respected reference tool, the Handbook of Latin American Studies (HLAS) is a selected, annotated, annual bibliography about 900 pages in length. Roughly 120 scholars, who serve as contributing editors, prepare the text as a labor of love for the Hispanic Division of the Library. HLAS records a wealth of bibliographical information on significant published writings in and about Latin America.

Published in alternating social sciences and humanities volumes, the handbook covers a wide range of subjects, including anthropology, economics, education, geography, government and politics, art, film/folklore, history, language, literature, music, and philosophy. To facilitate use of the bibliography, four indexes are included: abbreviations and acronyms; titles of journals indexed; subjects; and authors.

In a cooperative effort, the handbook is published by the University of Texas Press at Austin and the Library of Congress. Texas Press was chosen as our most recent publisher because of its renown in the field of Latin American publishing, its demonstrated experience in the use of computerized photocomposition techniques, and its ability to successfully market the series.

Production: The Manual Mode

The handbook was prepared manually until production of volume 42. A core of contributing editors was selected to critique material for inclusion. All material sent to the editors was processed manually, e.g., slipping (selecting) monographs and/or serials in various Library divisions; routing items to the Hispanic Division; typing and preparing bibliographic citations; typing charge slips for books on inter-library loan; xeroxing and mailing magazine articles; typing printer's copies of manuscript; assigning item numbers to each entry by either stamping with a numbering machine or writing the number by hand; and arranging sections of text in chronological, topical, or geographical order. Unfortunately, the list goes on and on and on.

The most tedious of the manual procedures was the typing of the four indexes. The subject index was particularly difficult because of its size: managing to keep about 10,000 3x5" cards in order in a box without ever dropping it, proved to be a tremendous challenge. Compilation began by reviewing the subject headings assigned by the editors and then comparing them to the Library of Congress Subject Headings. Each subject heading was typed on a card and filed alphabetically. The file grew to enormous proportions. When all the subject entries were completed, cross-reference were added. The cards were proofed a number of times and, after the final time, each card was stamped with a number to ensure numerical order, as well as alphabetical. The other indexes were completed with the same tedium.

Preparing the text of the book for submission to the publisher had always been done the same--it was typed, since we thought there was no other way. The difficulty was not the typing at the Library's editorial office, but the subsequent printer's typesetting. This almost always created additional errors that had to be caught (or perhaps not caught) at the various stages of proofing.

After years of working in the manual mode, the staff decided there had to be a better way. Voilà, automation!

Automation

As early as 1979, there had been discussion of automating the handbook. In that year, the Automated Systems Office established the Committee on Standards for Bibliographic Output Formats (COMBAT) as an interdepartmental working group to specify standard output format for publications generated from machine-readable files. The Bibliography Subgroup of COMBAT prepared the standard for automated bibliographies produced at LC. The standard was designed to meet the combined needs of all divisions that prepare bibliographies for print or computer output microform. It was anticipated that bibliographies would be produced from already existing MARC records with little or no editing.

The handbook was selected over other bibliographies as the pilot for the automated bibliography project because:

1. It is an ongoing bibliography that has been produced in LC for more than 40 years, thereby meeting the requirements of ASO that the pilot bibliography be recurring regularly and that its longevity be assured;
2. It has an in-house staff of five full-time persons, three of whom are professionals, all of whom have worked with the bibliography for a number of years and therefore are able to define their needs;
3. It is a multilingual publication that requires regular use of diacritics;
4. It covers a wider spectrum of materials than does any other ongoing bibliography in the Research Services Department;
5. It has made significant progress in the development of a thesaurus for its subject index;
6. Because of its extensive annotations and listing of serials, the handbook has more discrete fields, subfields, and hierarchies than do many bibliographies.

The present production procedures were studied and documented. Existing Library of Congress systems and software available for purchase were surveyed as possible alternatives. The desire to use existing cataloging data whenever possible and the ability to rely on familiar online searching techniques made MUMS the choice for records input and updating.

Currently, MUMS software is being modified and tested for the first release of the automated bibliography project. This application is unique in allowing creation of bibliographic records for many types of materials--books, serials, maps, journal articles, films, music, and sound recordings--on a single file.

"Automation"

In 1981, with volume 43, steps toward automation were begun by generating printouts of bibliographic citations from MUMS records. This procedure eliminated typing some of the citations. Bibliographic information, for which there was no record, i.e., books not cataloged at LC and serial articles, were still typed. Also, with that volume, the four indexes were produced on Lexitron diskettes. (The diskettes made the job easier for filing purposes, but did not allow for automatic alphabetizing. Complete automation will provide that feature.) The information was typed on diskettes and forwarded to the press. With a bit of conversion at the publisher, photo-ready galleys were produced from the diskettes without any retyping, saving much time and effort.

Since production of galleys from diskettes proved to be successful, we then tried typing the entire book on diskettes. It worked! A coding system was devised to instruct the printer on proper fonts and format. By using the diskettes, no retyping is required, and that means new errors are not generated. The stride from the manual mode to semi-automation has greatly improved the production efforts of both the handbook staff and the publisher.

Much progress has been made toward automating the production of the handbook, but we--and others in Research Services who have bibliographical projects--look forward impatiently to the first release of the automated bibliography project.

Alfreda H. Payne
Hispanic Division

THE AUTOMATED PAMPHLET PROJECT

In his 1867 Report to Congress, Librarian Ainsworth Spofford triumphantly announced the Library's acquisition of Peter Force's rich Americana collection. In the past the Library's role had been limited to that of a Congressional reference library with few national pretensions, but with the addition of the Force volumes the Library acquired a reputation as a major American research institution on a par with the Boston and New York public libraries.

Force, a former editor of the National Journal, mayor of the District of Columbia, and one of the country's earliest historical editors, amassed an enormous group of primary research material to support his investigations for The American Archives, a documentary history of the American Revolution. The eminent 19th century American historian Benjamin Lossing declared Force's library to be the best of its kind in the country when he used it at Force' s house before the Civil War.

The Pamphlet Collection

A significant number of the Force pamphlets are part of the 30,000 items in the Bound Pamphlet Collection in the Rare Book and Special Collections Division, documenting many of the most important aspects of the Anglo-American experience during the late 18th and early 19th centuries. As Bernard Bailyn determined in his Pamphlets of the American Revolution, 1750-1776, "It was in this form--as pamphlets--that much of the most important and characteristic writing of the American Revolution appeared. For the Revolutionary generation as for its predecessors back to the early sixteenth century, the pamphlet had peculiar virtues as a medium of communication."

Spofford, aware that the usefulness of the Force material would be seriously compromised without adequate processing, stated in 1867: "The immense mass of newspapers, and other periodicals, pamphlets, bound and unbound, maps, and other materials acquired with this [Force's] library... will be prepared for the catalog as soon as the titles of the bound books, now nearly completed, are disposed of."

Bibliographic Control

The speed of cataloging the Force collection which Spofford envisioned has slowed considerably during the intervening one hundred eighteen years. Today, random sampling indicates that fewer than fifty percent of the Bound Pamphlet Collection in the Rare Book and Special Collections Division can be identified by searching the Main Card Catalog. Those volumes represented are usually second or third copies of books existing elsewhere in the Library; unusual works are unrepresented. Few of the pamphlets are listed in the Library's Official Shelflist, fewer still in the division's shelflist, and fewer than one percent can be found on MARC. Incredibly, a large percentage of the collection consists of books not recorded by any institution in the National Union Catalog.

Looking for Solutions

My early investigations to determine a way to make the collection available to researchers ended after I encountered apparently insurmountable obstacles. The Special Materials Cataloging Division had insufficient staff to handle such a large volume of titles in a timely fashion, and the Automated Systems Office was unable to commit itself to any project which did not receive the highest departmental priority. At first glance the situation seemed comparable to being asked to compete in the Indianapolis 500 in a car which not only lacked wheels but an engine as well. The chance of success seemed remote.

MLC Chosen

But, a possible solution appeared after I made my first attempts. The collection could be brought under a form of bibliographic control either by an outside contractor or by appropriate internal Library personnel using Minimal Level Cataloging, these approaches requiring no software development by the Automated Systems Office. Minimal Level Cataloging would require that the Rare Book and Special Collections Division forego such important needs as subject cataloging of the pamphlets and online access to imprint information, but, in return, we would achieve three important goals: (1) assuring that researchers and staff would have author/title access to the collection; (2) providing a complete shelflist; and (3) identifying in at least a rudimentary way the large number of unrecorded pamphlets.

In order to guide the development of the project, an informal Library-wide working group was established. We completed a pilot project in August 1984 with the assistance of the Descriptive Cataloging Division. Presently, two publishers are ready to make proposals for publishing all or part of the pamphlets in hardcover or microform.

Problems

In spite of the strenuous efforts of the members of the group to design an uncomplicated system, it quickly became clear that this could be no self-contained, internal project. Each step involved Library-wide concerns, and many, such as the computerized coding level, dealt with national bibliographic issues. At times, the questions concerning previous cataloging codes, past shelflisting practices, and existing computer formats seemed insurmountable. The fact that some pamphlets were entered in PREMARC, others only in the Main Card Catalog, a few in MARC, and a large number had no existing entries in any catalog complicated the efforts of the group to devise a method which would be able to produce a complete shelflist automatically.

It is troubling that it has taken more than a century to arrive at this point. During the last twenty years, the Library has become the undisputed leader in library computer applications, but the delay in tackling problems such as the Force pamphlets is indicative of a disquieting attitude which I suspect is not limited to the Library of Congress. Automation at many institutions might be compared to a powerful wave sweeping across a pond, creating much activity on the surface, but leaving deeper water undisturbed. Much attention has been devoted to current technical processing problems, i.e., the cataloging of new books, but older collections' difficulties, such as those posed by the Force material and left unsolved by previous generations, have received disproportionately less energy.

C. P. Snow observed in 1959 in The Two Cultures and the Scientific Revolution that there had grown in society two groups whose values markedly differed, the scientific technologists and the cultural intellectuals. On a microcosmic level such a division exists today at the Library of Congress. The curator, devoted to interpretation and history, and those concerned primarily with automation in technical processing, sometimes fail to arrive at common goals or agendas. Both groups share equal blame for a failure to communicate.

The Automated Pamphlet Project is one small bridge between these two worlds, and its lessons can prove instructive. Much remains to be accomplished. In the Rare Book and Special Collections Division there are enormous numbers of broadsides, pamphlets, and books which cannot be found on either the computer files or in the Main Card Catalog. Many of these materials are in research collections which are central to the Library's mission. Though it is necessary that automation efforts be vitally concerned with improving workflow and efficiency of current operations, these goals should not be pursued at the expense of improving the access to important collections which have received inadequate treatment in the past. Whatever position the Library occupies in American culture today is due for the most part to its widespread image as the center for research on and the premier repository for significant printed documents and manuscripts of American history. To ignore in any way the important older research material in the Library's collections is to run the risk of compromising the identity of this institution.

James W. Gilreath
Rare Book and Special Collections Division

[Since this article was written, the Automated Pamphlet Project was implemented. Ed.]